

# SONY®

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VIDEOCASSETTE RECORDER

**UVW-1800/1400**  
**UVW-1800P/1400P**

VIDEOCASSETTE PLAYER

**UVW-1600/1200**  
**UVW-1600P/1200P**

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## SERVICE MANUAL Vol.1

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### SUPPLEMENT-2

Please add and replace your manual with this SUPPLEMENT-2.

\*Supplement-1 has not been issued for U VW-1800P/1600P/1400/1200/1400P/1200P.

Applicable Manual

Vol.1 1st Edition (9-977-551-11) : 1800/1600(UC)

Vol.1 1st Edition (9-977-566-11) : 1800P/1600P(EK)

Vol.1 1st Edition (9-977-570-11) : 1400/1200(UC)

Vol.1 1st Edition (9-977-572-11) : 1400P/1200P(EK)

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UVW-1800/1600  
UVW-1800P/1600P  
UVW-1400/1200  
UVW-1400P/1200P (英)  
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### 13. ELECTRICAL ALIGNMENT AFTER REPLACEMENT BOARDS

#### UVW-1200P

##### AP-34 Board

1. PB Mode Adjustment ..... 13-17
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  - 1-2. PB Level Adjustment ..... 13-18

#### UVW-1400P

##### AP-31 Board

1. PB Mode Adjustment ..... 13-19
  - 1-1. PB Dolby off Frequency Response Adjustment ..... 13-19
  - 1-2. PB Level Adjustment ..... 13-20
2. EE Mode Adjustment ..... 13-20
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##### AR-14 Board

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#### VP-44 Board

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6. U-V Axis Phase (B-Y, R-Y Phase) Adjustment  
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#### VRA-5 Board

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#### SS-53 Board

1. System ID Switch Setting ..... 13-63
2. Character Size Adjustment ..... 13-63

### Volume-2

#### 14. BLOCK DIAGRAMS

#### 15. BOARD LAYOUTS

#### 16. SCHEMATIC DIAGRAMS

#### 17. SEMICONDUCTOR PIN ASSIGNMENTS

#### 18. SPARE PARTS AND OPTIONAL FIXTURES

## PLUNGER CHECK

The items of the "PLUNGER CHECK" are explained here.

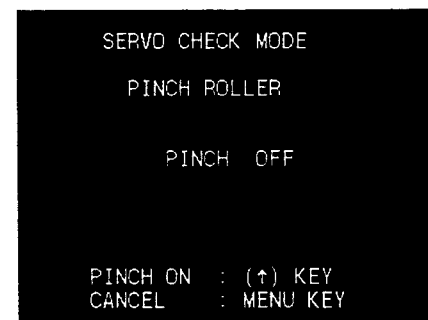
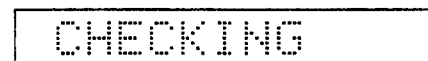
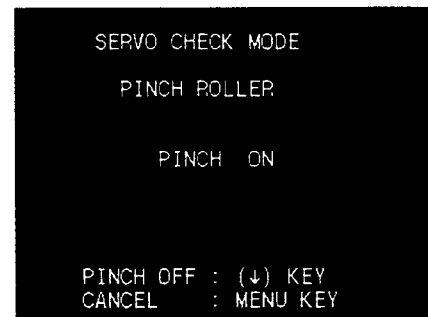
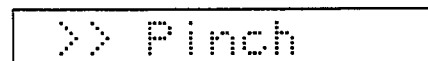
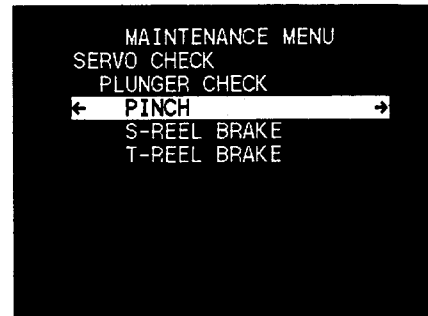
### (1) PINCH

This mode checks the pinch roller solenoid.

When selecting the SET (YES) key, threading takes place and the pinch solenoid is activated.

When selecting the MENU key, the pinch solenoid is released and unthreading takes place.

And the monitor returns to the menu screen.



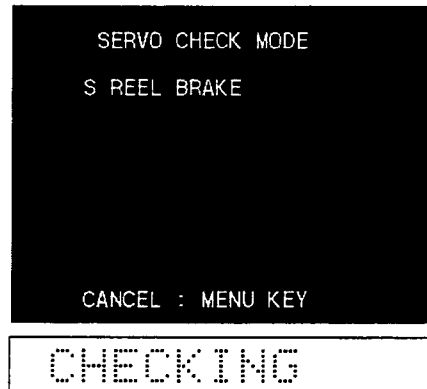
## (2) S-REEL BRAKE

This item checks of the S reel brake solenoid.

1. Press the SET (YES) key.  
S-reel brake solenoid is activated.
2. Press the MENU key.  
Then S-reel brake solenoid is released.  
And the monitor returns to the menu screen.

### In case of NG

If the S brake solenoid does not make the actuating sound, and monitor does not change, check the S-reel brake solenoid and its driver circuit (DR-214 board and MS-39 board).



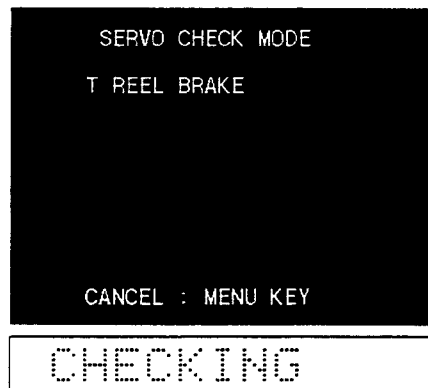
## (3) T-REEL BRAKE

This mode checks of the T reel brake solenoid.

1. Press the SET (YES) key.  
T-reel brake solenoid is activated.
2. Press the MENU key.  
Then T-reel brake solenoid is released.  
And the monitor returns to the menu screen.

### In case of NG

If the T brake solenoid does not make the actuating sound, and monitor does not change, check the T-reel brake solenoid and its driver circuit (DR-214 board and MS-39 board).





## AUTO CHECK

This is the function to automatically check whether the unit operates normally or not. The check stops as soon as an error occurs during checking.

Press the (→) key to enter the diagnosis.

### (1) WITHOUT A TAPE

Checks the motors, plunger and sensors individually. The checks are performed in the following orders. They takes about 4 to 5 minutes in all.

#### 1. Sensor Check

Checks whether the following sensors operates correctly in cassette-out condition.

- The reel hub size sensor should be "LARGE".
- The oxide/metal sensor should be "METAL".
- The cassette in sensors 1 and 2 should be "cassette out".
- The cassette size sensor should be "SMALL".
- The tape top sensor should be "OFF".
- The tape end sensor should be "OFF".
- The humidity sensor should be "DRY".
- The small cassette MISS-REC sensor should be "ON". (only for recorders)
- The large cassette MISS-REC sensor should be "ON". (only for recorders)

2. Cassette Compartment Operation Check
3. Reel Table Shift Operation Check
4. S Reel Motor/Brake Solenoid Operation Check
5. T Reel Motor/Brake Solenoid Operation Check
6. Drum Motor Operation Check
7. Threading Operation Check
8. Pinch Roller Solenoid Operation Check
9. Unthreading Operation Check
10. Capstan Motor Operation Check



```
MAINTENANCE MENU
SERVO CHECK
AUTO CHECK
← WITHOUT A TAPE →
WITH A TAPE
WITH ALIGNMENT TAPE
WITH A NEW TAPE
```

## (2) WITH A TAPE

Using a blank tape, checks the typical operation.

The check is performed in the following order. It takes about 4 to 5 minutes by using a small tape and about 8 to 9 minutes by using a large tape.

small tape (30 minutes)

1. cassette down
2. threading
3. stop
4. rew (→ tape top)
5. play
6. search fwd x1/30, x1/2, x1, x5
7. search rev x1/30, x1/2, x1, x5
8. ff top → end
9. rew end → top
10. unthreading
11. cassette up

large tape (90 minutes)

1. cassette down
2. threading
3. stop
4. rew (→ tape top)
5. play
6. search fwd x1/30, x1/2, x1, x5
7. search rev x1/30, x1/2, x1, x5
8. ff top → end
9. rew end → top
10. unthreading
11. cassette up

## (3) WITH AN ALIGNMENT TAPE

Using an alignment tape (CR2-1B or CR2-1B PS), checks the PB servo system.

The check is performed in the following order. It takes about one minute.

1. cassette down
2. threading
3. stop
4. ctl lock check
5. capstan speed check
6. switching position adjustment check
7. unthreading
8. cassette up



```
MAINTENANCE MENU
SERVO CHECK
  AUTO CHECK
    WITHOUT A TAPE
    ← WITH A TAPE →
    WITH ALIGNMENT TAPE
    WITH A NEW TAPE
```



```
MAINTENANCE MENU
SERVO CHECK
  AUTO CHECK
    WITHOUT A TAPE
    WITH A TAPE
    ← WITH ALIGNMENT TAPE →
    WITH A NEW TAPE
```

#### (4) WITH A NEW TAPE (only for recorders)

Using a non-recorded tape, checks recording and playing back of CTL and TIME CODE.

The check is performed in the following order. It takes about one and a half minute.

1. cassette down
2. threading
3. stop
4. rew (→ tape top)
5. rec
6. rew (→ tape top)
7. play
8. ctl lock check
9. capstan speed check1
10. capstan speed check2

The data is compared to those from checking at using an alignment tape in order to check whether the unit records at the proper tape speed or not. Therefore, perform this check as soon as performing (3) WITH AN ALIGNMENT TAPE.

11. time code check
12. unthreading
13. cassette up



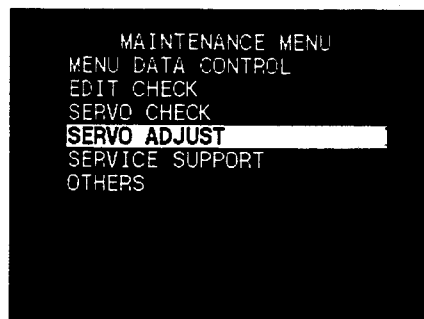
```
MAINTENANCE MENU
SERVO CHECK
AUTO CHECK
  WITHOUT A TAPE
  WITH A TAPE
  WITH ALIGNMENT TAPE
← WITH A NEW TAPE →
```

## 4-5. SERVO ADJUST (1800/1800P/1600/1600P) 4-4. SERVO ADJUST (1400/1400P/1200/1200P)

Servo system is adjusted automatically or semiautomatically in this menu.

### [Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVO ADJUST" on the monitor display using the (↑), (↓) keys.



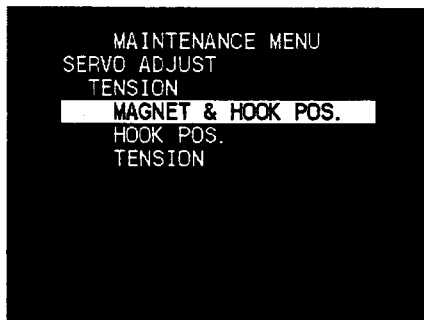
SV Adjust

3. Press the (→) key.  
Then "SERVO ADJUST" is selected, and the menu of the lower level is displayed.



>Reel & Cap

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.  
Then the menus of the lower level are displayed.



>Magnet

6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.  
(Refer to each page of item about a method of adjustment.)
8. When adjustment is finished, press the MENU key to return to the menu picture.  
Or, press the (←) key to return to the MENU key.
9. If there are other items wishing to be checked, repeat steps 4 to 8.
10. When all the checks are performed, the adjustment data is saved in EEPROM by executing the "SAVE/LOAD CONTROL".

**Note :** When one item of adjustment is completed, the adjustment data can be saved in EEPROM by executing the "SAVE/LOAD CONTROL". When items of more than two adjustments are completed, the adjustment data can be saved in EEPROM by executing the "SAVE/LOAD CONTROL".  
Never turn off the power in the adjustment. If the power is turned off in the adjustment, the adjustment data will be erased.

11. When closing the maintenance menu, press the MENU key.

**Note :** When the MENU key is pressed in executing the check, the check is ended by force. Then, the monitor returns to the menu picture.

## S/T REEL & CAPSTAN

Adjustment related to S-reel, T-reel and capstan are performed automatically.

Confirm that adjustment is performed, and "COMPLETE" is displayed.

### Items of adjustment

- s reel fg check
- s reel offset/friction
- s reel torque
- t reel fg check
- t reel offset/friction
- t reel torque
- capstan fg duty
- capstan free speed

When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

### In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit, the capstan motor driver circuit and the capstan FG amplifier circuit (DR-214 board, SS-53 board).



#### **S-REEL ONLY**

Adjustment related to S-reel are performed automatically.  
Confirm that adjustment is performed, and "COMPLETE" is displayed.

#### **Items of adjustment**

- s reel fg check
- s reel offset/friction
- s reel torque

When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

#### **In case of NG**

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit (DR-214 board, SS-53 board).



SERVO ADJUST MODE  
S REEL TORQUE  
  
COMPLETE  
  
ADJUST MENU : (←) KEY



COMPLETE

#### **T-REEL ONLY**

Adjustment related to T-reel are performed automatically.

Confirm that adjustment is performed, and "COMPLETE" is displayed.

#### **Items of adjustment**

- t reel fg check
- t reel offset/friction
- t reel torque

When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

#### **In case of NG**

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit (DR-214 board, SS-53 board).





#### CAPSTAN ONLY

Adjustment related to capstan are performed automatically.  
Confirm that adjustment is performed, and "COMPLETE" is displayed.

#### Items of adjustment

- capstan fg duty
- capstan free speed

When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

#### In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the capstan motor driver circuit (DR-214 board and SS-53 board) and the capstan FG amplifier circuit (SS-53 board).



SERVO ADJUST MODE  
CAPSTAN FREE SPEED  
  
COMPLETE  
  
ADJUST MENU : (←) KEY



COMPLETE

## TENSION

The item "TENSION" are explained here.

### (1) MAGNET & HOOK POS

Tension regulator magnet adjustment and hook position adjustment.

\* Refer to section 6-37.

### (2) HOOK POS

Tension regulator hook position adjustment only.

\* Refer to section 6-38.

### (3) TENSION

Tension adjustment using Tentelometer.

\* Refer to section 6-36.

```
MAINTENANCE MENU
SERVO ADJUST
TENSION
MAGNET & HOOK POS.
HOOK POS.
TENSION
```

>Magnet

```
SERVO ADJUST MODE

PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-37).
```

SET THE PIN ( 3mm ).

NEXT : (→) KEY  
CANCEL : MENU KEY

ADJUSTING

```
SERVO ADJUST MODE

PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-38).
```

NEXT : (→) KEY  
CANCEL : MENU KEY

ADJUSTING

```
SERVO ADJUST MODE

PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-36).
```

SET CASSETTE  
AND PUSH STOP KEY.

CANCEL : MENU KEY

ADJUSTING

## RF SWITCHING POSITION

The sub menus of the "RF SWITCHING POSITION" are explained here.

### (1) AUTO

This mode adjusts the RF switching position automatically.  
Insert an alignment tape CR2-1B, and press the play button.

**Note :** Be sure to use the alignment tape CR2-1B.  
Do not use other alignment tape.

Confirm that adjustment is performed, and "COMPLETE" is displayed.

The cassette tape eject automatically.

When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

#### In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check that the played alignment tape was CR2-1B (CR2-1B PS) or not. And check the DO pulse circuit.

### (2) MANUAL

This mode adjusts the RF switching position manually.

\* Refer to section 7-13.

```
MAINTENANCE MENU
SERVO ADJUST
RF SWITCHING POSITION
← AUTO →
MANUAL
```

AUTO

```
SERVO ADJUST MODE
RF SWITCHING POSITION
AUTO ADJUST
```

SET ALIGNMENT TAPE CR2-1B  
AND PUSH PLAY KEY.

CANCEL : MENU KEY

ADJUSTING

```
SERVO ADJUST MODE
RF SWITCHING POSITION
AUTO ADJUST
```

COMPLETE

ADJUST MENU : (←) KEY

COMPLETE

## PICTURE SPLITTING

This mode adjusts the picture splitting.

**Note :** Before performing this adjustment, be sure to set an alignment tape CR5-1B/CR5-1B PS to the timecode, 8:00.

For adjustment, the portion between 8:00 and 26:00 on the tape is used.

Do not use the portions of 8:00 and former and 26:00 and later on the tape, because the adjustment cannot be performed correctly.

Select AUTO or MANUAL from the monitor display.

### (1) AUTO

The adjustment are performed automatically.

As prescribed on the monitor display, insert the alignment tape CR5-1B (CR5-1B PS) with set to 8:00. Then, press the PLAY key.

Confirm the adjustment is performed, and "COMPLETE" is displayed.

When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

SERVO ADJUST MODE

PICTURE SPLITTING

PERFORM ADJUSTMENTS  
REFERRING TO SERVICE  
MANUAL (4-5).

SET  
ALIGNMENT TAPE CR5-1B  
AND PUSH PLAY KEY.

CANCEL : MENU KEY

ADJUSTING

SERVO ADJUST MODE

PICTURE SPLITTING  
AUTO ADJUST

NOW ADJUSTING ...

CANCEL : MENU KEY

ADJUSTING

SERVO ADJUST MODE

PICTURE SPLITTING  
AUTO ADJUST

COMPLETE

ADJUST MENU : (←) KEY

COMPLETE

## (2) MANUAL

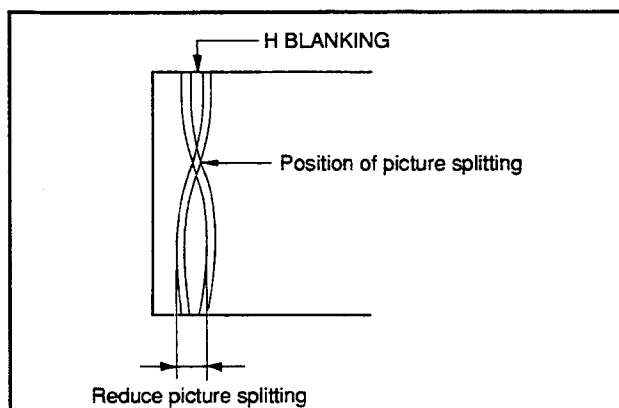
1. Connect the video monitor to TP201 on the VP-43 board using the clip cable.

\* Set the monitor as following.

- H DELAY
- AFC FAST
- INT SYNC

**Note :** It is impossible to observe picture splitting with the video monitor which captured the H sync strongly by the AFC circuit in the monitor.

2. Make adjustment according to the instruction shown on screen.



SERVO ADJUST MODE

PICTURE SPLITTING

MEMOIZE POSITION OF  
PICTURE SPLITTING.

NEXT : (→) KEY  
CANCEL : MENU KEY

ADJUSTING

SERVO ADJUST MODE

PICTURE SPLITTING

SHIFT THE LARGE SPLITTING  
TO THE SAME POSITION  
OF MEMORIZED POSITION  
WITH (↑) OR (↓) KEY.

NEXT : (→) KEY  
CANCEL : MENU KEY

ADJUSTING

SERVO ADJUST MODE

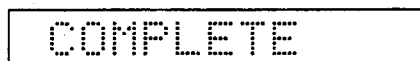
PICTURE SPLITTING

REDUCE PICTURE  
SPLITTING  
WITH (↑) OR (↓) KEY.

NEXT : (→) KEY  
CANCEL : MENU KEY

ADJUSTING

3. Confirm that adjustment is performed and "COMPLETE" is displayed.



When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

## SAVE/LOAD CONTROL

The sub menus of the "SAVE/LOAD CONTROL" are explained here.

```
MAINTENANCE MENU
SERVO ADJUST
SAVE/LOAD CONTROL
← SAVE ADJUSTING DATA →
LOAD ADJUSTING DATA
INITIALIZE
```

```
>>Save
```

### (1) SAVE ADJUSTING DATA

Save the adjustment data in EEPROM.

Confirm that Save is performed, and "COMPLETE" is displayed.

**Note :** After adjustment is completed, make sure to save in this mode.

```
SERVO ADJUST MODE
```

```
NOW SAVING ...
```

```
COMPLETE
```

```
ADJUST MENU : (←) KEY
```

### (2) LOAD ADJUSTING DATA

Load the adjustment data in EEPROM.

Confirm that Load is performed, and "COMPLETE" is displayed.

```
SERVO ADJUST MODE
```

```
NOW LOADING ...
```

```
COMPLETE
```

```
ADJUST MENU : (←) KEY
```

### (3) INITIALIZE

Perform this item only when either MS-39 board or microcomputer on the MS-39 board is exchanged.

Load the Initial data of adjustment data from ROM.

Load the initial data of the adjustment data from ROM.

Confirm that Initialize is performed, and "COMPLETE" is displayed.

```
SERVO ADJUST MODE
```

```
INITIALIZE
```

```
COMPLETE
```

```
ADJUST MENU : (←) KEY
```

```
COMPLETE
```

4-37 (1800/1800P/1600/1600P)  
4-35 (1400/1400P/1200/1200P)

## 4-6. SERVICE SUPPORT (1800/1800P/1600/1600P) 4-5. SERVICE SUPPORT (1400/1400P/1200/1200P)

### Overview of self-diagnosis function

Servo and mechanical control systems process software in microprocessors, and make a judgement about errors by various informations. As a result, we consider that only to display the error codes is not enough information to analyze the probable cause which an error occurs. Especially, when occurring the non-repeatable error, it is very difficult to judge where we would check. For improving the efficiency of service, we have studied how to shorten the time which customers are inconvenient. From the study, we conclude that the following functions are on board of the unit.

- (1) The unit carries out an analysis from the data when the error has occurred. As a result of the analysis, the probable blocks with troubled are specified.
- (2) For every block, the unit diagnoses itself as much as possible. When needing the assistance of a person, the unit focuses the troubled portion with proceeding the diagnosis in an interactive manner from the characters on the monitor display.
- (3) The unit automatically checks that the operations of devices and tape path system are normally performed or not.
- (4) The unit diagnoses whether any error is occurred on the individual device or not.

The previous "SERVO CHECK" operates the individual device only, but does not diagnose the device.

As the consistency of "SERVICE SUPPORT", we add the diagnosis functions for the individual device.

From this addition, the previous "SERVO CHECK" function might not be necessary, but we decide that the function is preserved by dividing the purposes at using into the followings.

#### Purpose of "SERVICE SUPPORT"

Checks that the individual device operates normally.

Detects the device which an error occurs.

#### Purpose of "SERVO CHECK"

Checks the operation of the individual device. In checking, measures the waveform and so on.

This is used for various adjustments and checks.

- (5) "ERROR LOG CLEAR"

The previous "ERROR LOG CLEAR" could not reset the ERROR LOGs which had occurred previously. The unit could not be decided the ERROR LOGs which were remained in the software had been repaired or not.

Therefore, we add a reset function.

To operate the added functions, the system control and servo ROMs must be the following versions.

#### SS-53 board

##### System Control

IC4 Ver 2.00 8-759-326-97 C1001-UVW1000SY-V200

##### Servo

IC212 Ver 2.00 8-759-326-96 C2001-UVW1000SV-V200

\* The unit also diagnoses the errors which occurred in the ROM of the previous version after replacing the ROM to that of the above version, though some analysis cannot be done. However, be sure to replace the pair of ROMs. When replacing one ROM, the unit might not only be unfunctioned but also be misoperated.

These added functions are our first attempt and are designed by trial and error from the past experience. Some design compromises are in these functions under constraints. Therefore, we have considered that these functions are not completed 100% but are coming along. Please send the comment about the functions, if you have any comment after using the functions.

4-38(1800/1800P/1600/1600P)

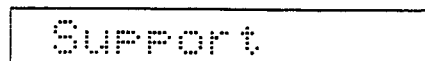
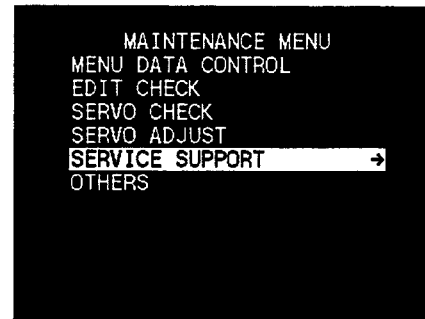
4-36(1400/1400P/1200/1200P)



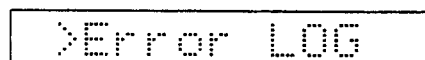
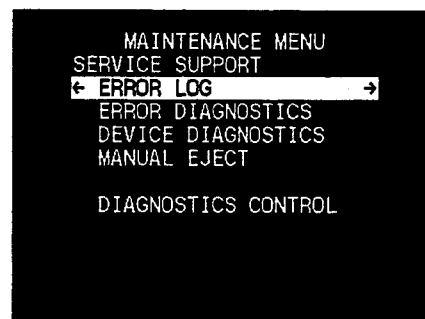
This item has the functions to display and diagnose the errors and the error codes that have occurred in the past and also the function to diagnose the devices. Furthermore, this has the function to clear the ERROR LOG.

**[Procedure]**

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVICE SUPPORT" on the monitor display using the (↑), (↓) keys.



3. Press the (→) key.  
Then "SERVICE SUPPORT" is selected, and the menu of the lower level is displayed.



4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.  
Then the menus of the lower level are displayed.
6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.  
(Refer to each page of item about a method of check.)
8. When check is finished, press the MENU key to return to the menu picture.
9. If there are other items wishing to be checked, repeat steps 4 to 8.
10. When closing the maintenance menu, press the MENU key.

### To suspend the diagnosis temporarily

In the following cases, be sure to save the result of the diagnosis until the diagnosis is suspended.

- In the case that continuing the diagnosis after suspending the diagnosis.
- In the case that turning off the power during diagnosing depending on the diagnosis items.

### [How to operate]

1. Press the MENU key when the display with suspending the diagnosis is indicated.
2. Press the YES key to save the data of the diagnosis.
3. When "DIAG. WAS DISCONTINUED." is displayed, turn off the power and perform some repair jobs to be necessary.
4. After completing the repair jobs, turn on the power again. Then, press the SET key to continue the diagnosis.

**Note :** When turning off the power once, be sure to save the data of the diagnosis.  
If not, the diagnosis cannot be continued.

4-40 (1800/1800P/1600/1600P)  
4-38 (1400/1400P/1200/1200P)

ERROR-32-000

• CN108-14B/SS  
~ CN300-37B/DR  
IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

ERROR-32-000

SAVE DIAGNOSTICS DATA?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY

ERROR-32-000

DIAG. WAS DISCONTINUED.

RESUME : (←) KEY

DIAGNOSTICS MODE

CLEAR : RESET KEY  
RESUME : SET KEY

ERROR-32-000

• CN108-14B/SS  
~ CN300-37B/DR  
IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

**To abort the diagnosis during diagnosing**

The diagnosis is aborted during diagnosing.

**[How to operate]**

1. Press the MENU key when any display is indicated.
2. Press the NO key to stop saving the data.

```
ERROR-32-000  
SAVE DIAGNOSITCS DATA?  
  
NO : NO KEY  
YES : YES KEY  
PREVIOUS : (-) KEY
```

3. Abort the diagnosis.

```
ERROR-32-000  
DIAGNOSTICS COMPLETED.  
  
PUSH ANY KEY
```

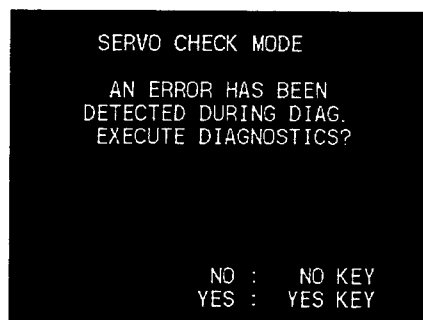
### When a new error is occurred during diagnosing

When a new error is occurred during diagnosing, diagnosing the new error takes priority over now-diagnosing. Therefore, the unit stops the now-diagnosing.

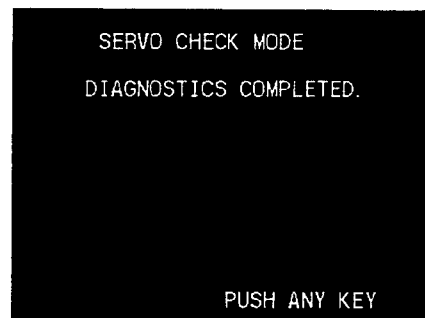
First, the unit diagnoses the new error. Then, if necessary, the unit diagnoses the last diagnosis again.

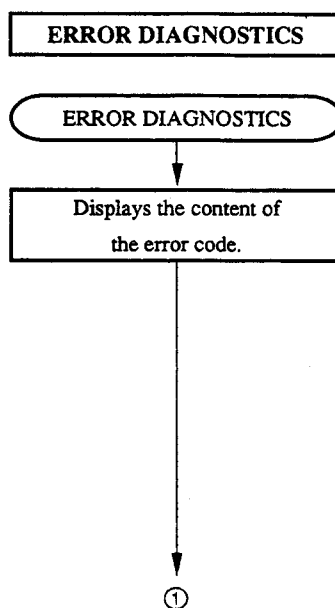
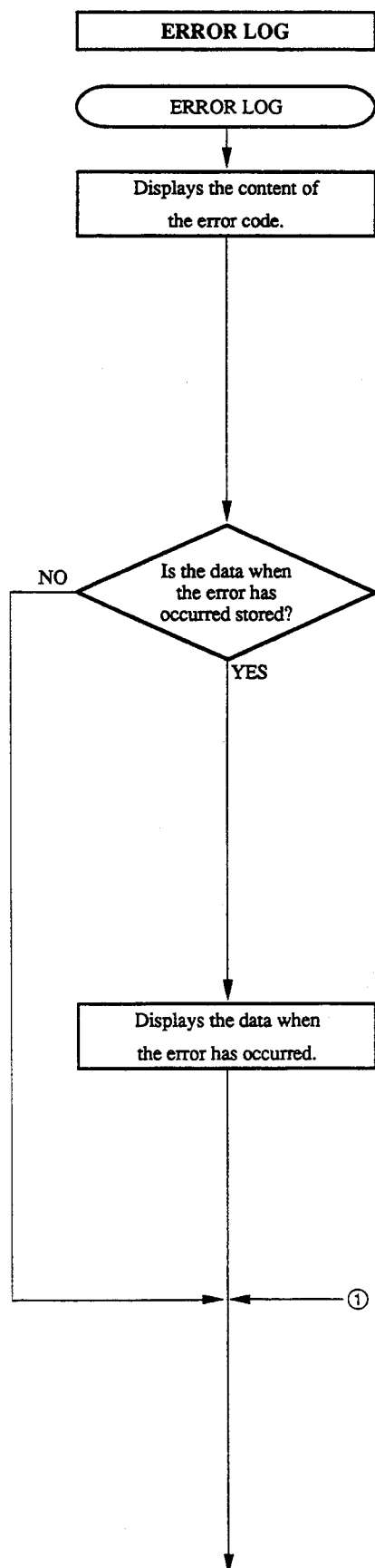
### [How to operate]

1. Press the YES key to diagnose the new error.



2. After completing the diagnosis of the new error, perform the last diagnosis with gone back to the first step if necessary.





SLACK

TAPE SLACK DETECTED  
WHILE IN PLAY/REC MODE.

NEXT : (→) KEY  
CANCEL : MENU KEY

SLACK

NO DATA

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Maximum two data of the errors that have occurred are stored from the most recent one.
- However, the data are not stored when the power is turned off while saving the data.

SLACK

HOURS METER T1: 331H ← The value, when the error has occurred, of HOURS METER T1

FROM POWER ON: 18M ← The time until the error has occurred after the power had been turned on

MODE: F. FWD/REW ← The previous mode but one before the error has occurred

↓

STOP ← The previous mode before the error has occurred

↓

PLAY/REC ← The mode when the error has occurred

NEXT : (→) KEY

PREVIOUS : (←) KEY

CANCEL : MENU KEY

Continues to the next page.

Displays the probable blocks  
with troubled

- The unit carries out an analysis from the data when the error has occurred.  
As a result of the analysis, the probable blocks with troubled are divided into two blocks.

```

ERROR-02-603

RELATED BLOCK  1
S REEL BLOCK
T REEL BLOCK
CAPSTAN BLOCK
TAPE TRANSPORT
TAPE

NEXT :  (→) KEY
CANCEL : MENU KEY
  
```

(1) RELATED BLOCK 1

..... Highly probable blocks with troubled

```

ERROR-02-603

RELATED BLOCK  2
DRUM BLOCK
THREADING BLOCK
REEL POSITION BLOCK
CASS-COMPARTMENT BLOCK
PINCH BLOCK
CONTINUED...
NEXT :  (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

```

ERROR-02-603

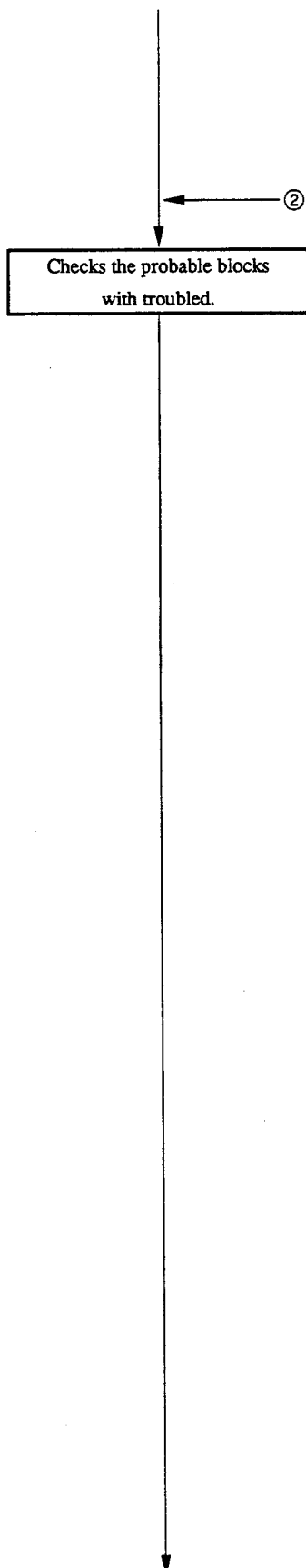
RELATED BLOCK  2
CASSETTE ID BLOCK
TOP/END SENSOR BLOCK
TENSION SENSOR BLOCK

NEXT :  (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

(2) RELATED BLOCK 2

..... Probable blocks with troubled

- In the following cases, RELATED BLOCK 1 are not displayed.
  - In the case that the most highly probable blocks cannot be specified from the data when the error has occurred.
  - In the case that the data when the error has occurred is not stored.
  - In the case that the diagnosis is run by ERROR DIAGNOSTICS.



- When TAPE TRANSPORT or TAPE is displayed on the RELATED BLOCKs, the probable cause is that the tape clings to tape path system and drum. In the case that a cassette tape is in the unit, check that the tape clings to the drum, capstan, heads, tape guides and so on or not. Then, take out the cassette tape. In the case of using the cassette tape when the error has occurred, check that something attaches to the tape or not.

- Checks each block in order.  
The contents of check are different from each device. For details, refer to the flowchart of each device.

```

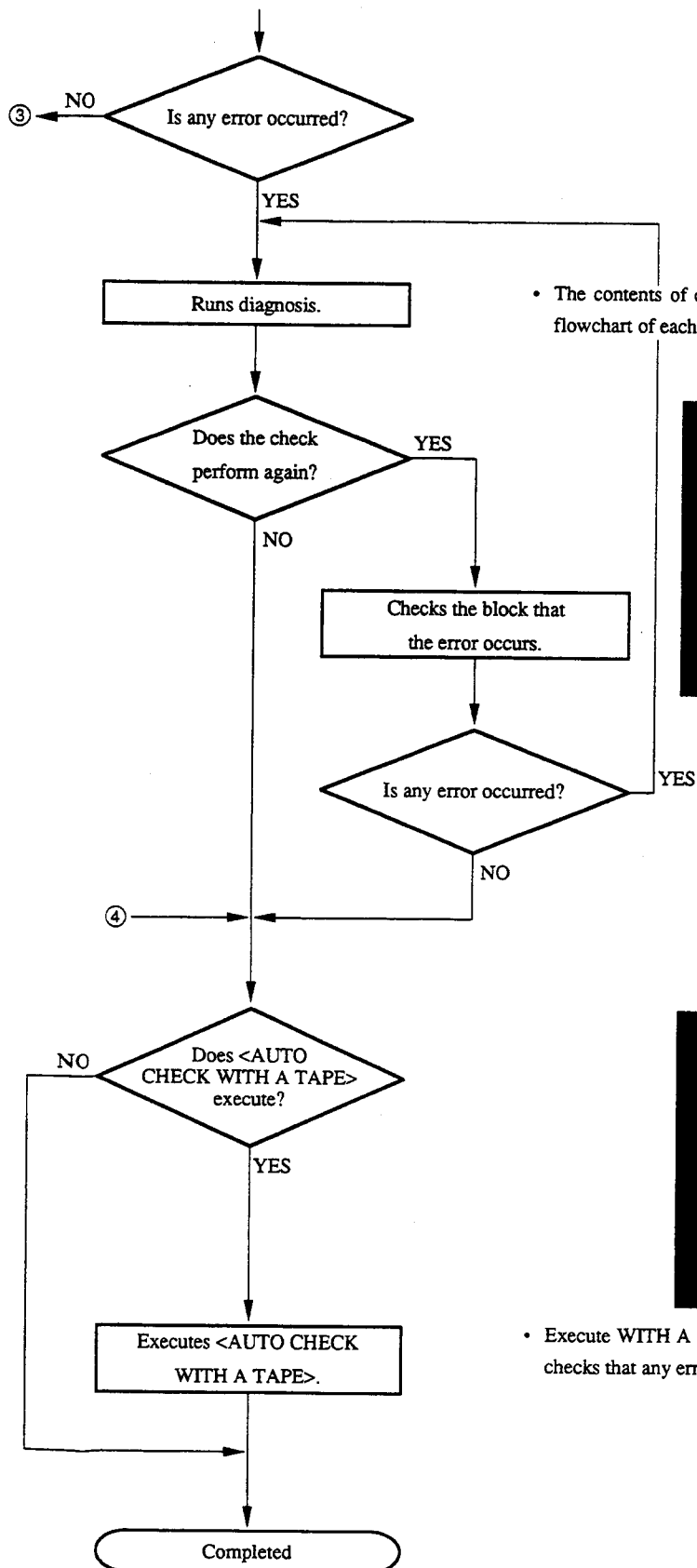
ERROR-02-603

T-REEL
DIAG. WILL EXECUTE.

NEXT : (→) KEY
PREVIOUS : (←) KEY
SKIP : (↓) KEY
CANCEL : MENU KEY
  
```

- Press the (→) key to enter the unit into diagnosis function.  
Press the (←) key to return the picture to the previous picture.  
Press the (↓) key to skip the block that is diagnosed once.

Continues to the next page.



- The contents of check are different from each device. For details, refer to the flowchart of each device.

ERROR-02-603

T-REEL  
EXECUTE DIAG. AGAIN?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

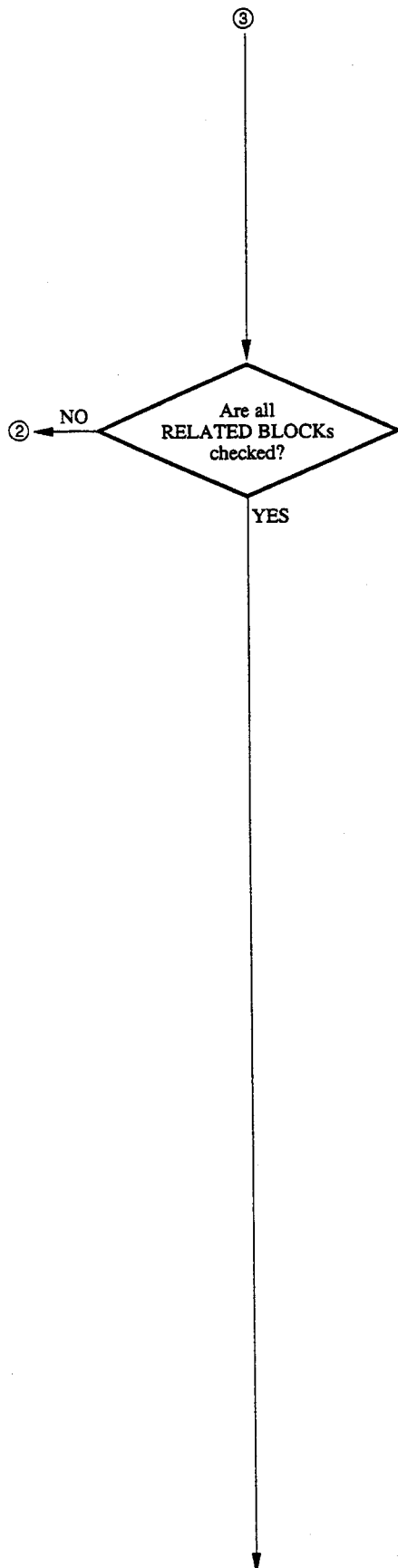
ERROR-02-603

EXECUTE  
< AUTO CHECK  
WITH A TAPE >?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Execute WITH A TAPE in SERVO CHECK or AUTO CHECK. Then, the unit checks that any error occurs or not automatically.





ERROR-02-603

T-REEL  
CHECK COMPLETED.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

ERROR-20-018

DEFECT COULD NOT BE  
FOUND. GO TO  
THE NEXT PROCEDURE.

NEXT : (→) KEY  
CANCEL : MENU KEY

ERROR-02-603

TAPE PATH CLEANING  
TAPE PATH CHECK/ADJUST  
REEL TABLE HEIGHT CHECK

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Perform check with referring to section 7 in Service Manual Vol. 1.

Continues to the next page.



④

ERROR-02-603

CONNECTOR, HARNESS CHECK  
T REEL BLOCK  
REEL POSITION BLOCK  
CASS-COMPARTMENT BLOCK

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

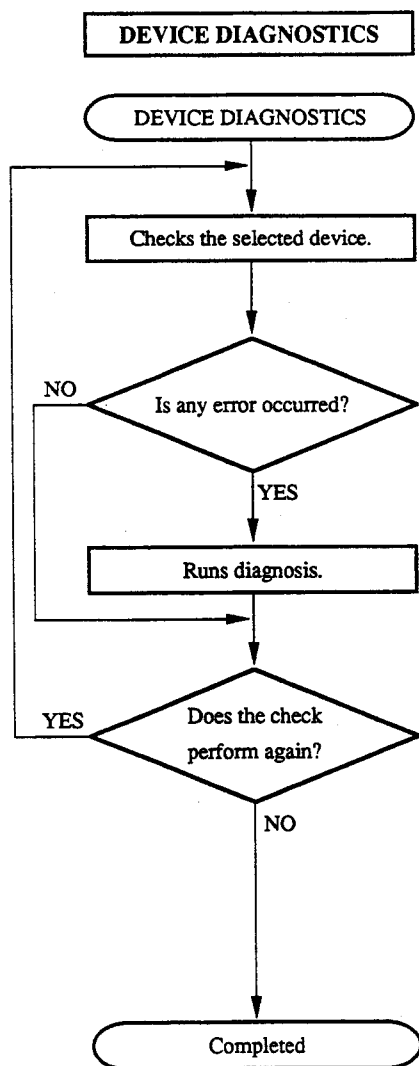
- Check all connectors and harnesses in relation to the blocks that are displayed with referring to block diagrams.

ERROR-02-603

SOLDER CHECK  
T REEL BLOCK  
REEL POSITION BLOCK  
CASS-COMPARTMENT BLOCK

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check the solders on the blocks that are displayed with referring to block diagram.



- The contents of the check are different from each device. For details, refer to the flowchart of each device.

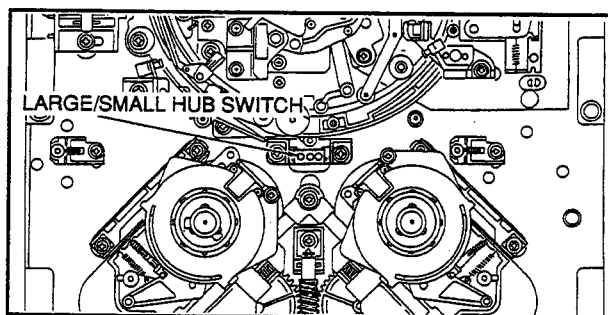
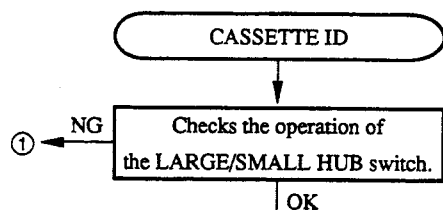
- The contents of the diagnosis are different from each device. For details, refer to the flowchart of each device.

```

T-REEL
T-REEL
EXECUTE DIAG. AGAIN?

NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

(1) CASSETTE ID Diagnosis



CASSETTE ID SENSOR  
HUB SIZE SWITCH  
PRESS AND CHECK IT.  
LARGE HUB

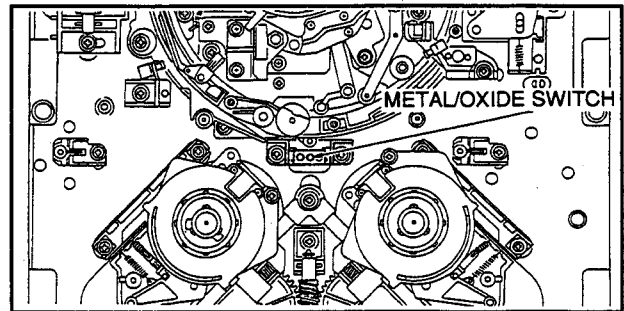
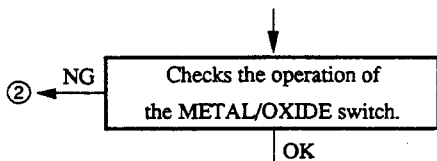
NG : NO KEY  
OK : YES KEY  
CANCEL : MENU KEY

<How to decide>

	Not pressing by hand	Pressing by hand	Decision
Display	LARGE HUB	SMALL HUB	OK
	LARGE HUB	LARGE HUB	NG
	SMALL HUB	SMALL HUB	NG

NG ①

4-50 (1800/1800P/1600/1600P)  
4-48 (1400/1400P/1200/1200P)



CASSETTE ID SENSOR  
METAL/OXIDE SWITCH  
PRESS AND CHECK IT.

METAL

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

<How to decide>

	Not pressing by hand	Pressing by hand	Decision
Display	METAL	OXIDE	OK
	METAL	METAL	NG
	OXIDE	OXIDE	NG

NG ②

Checks the installation of the MS board.

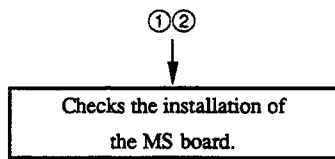
CASSETTE ID SENSOR  
MS BOARD  
CHECK INSTLLATION.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

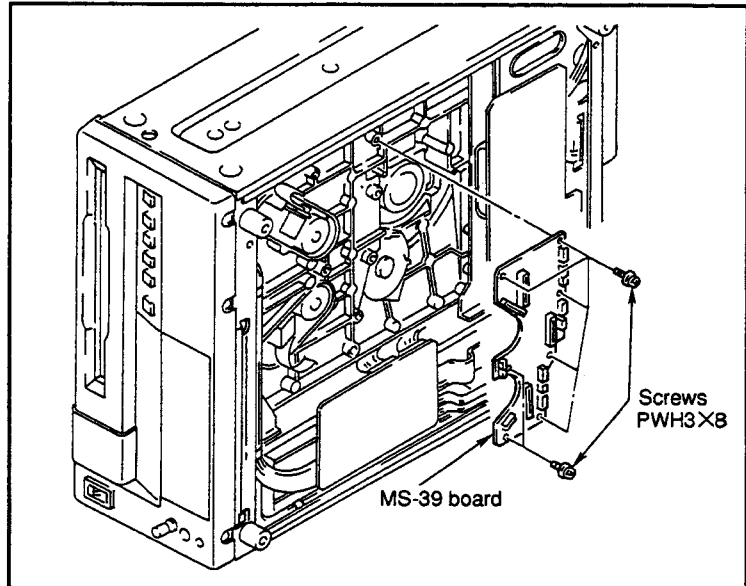
CASSETTE ID SENSOR  
MS BOARD  
INSTALL IT AGAIN.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

Completed



• Installation of the MS-39 board



**Check :** The all seven screws (PWH3×8) should be tightened.  
There should not be clearance between the MS board and the mechanical parts.

CASSETTE ID SENSOR  
MS BOARD  
CHECK INSTLLATION.

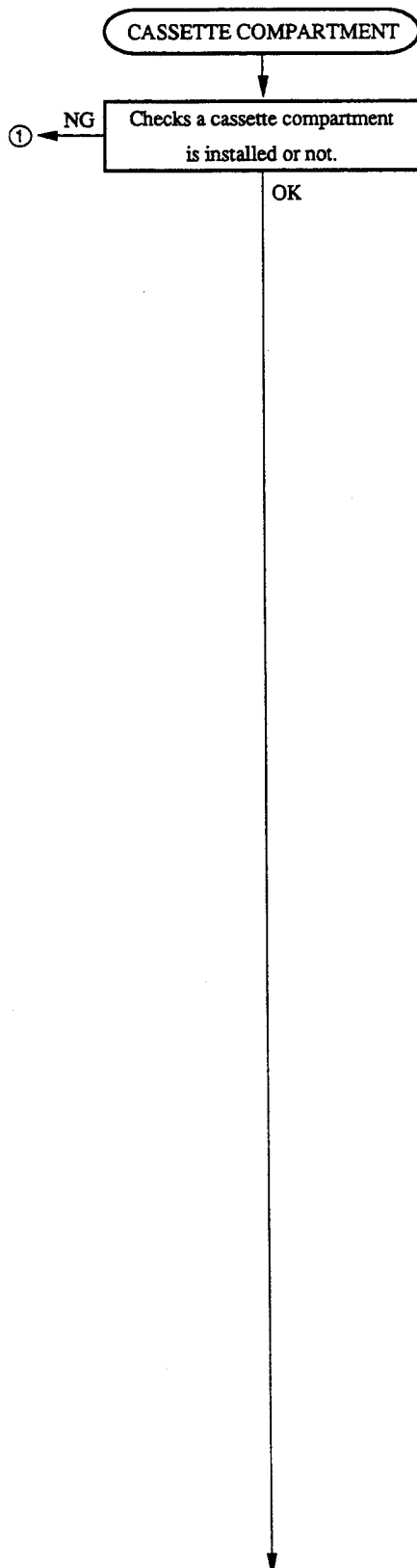
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

CASSETTE ID SENSOR  
MS BOARD  
INSTALL IT AGAIN.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

Completed

## (2) CASSETTE COMPARTMENT Diagnosis



CASS-COMPARTMENT SENSOR  
IS A CASS-COMPARTMENT  
INSTALLED?

NG : NO KEY  
OK : YES KEY  
CANCEL : MENU KEY

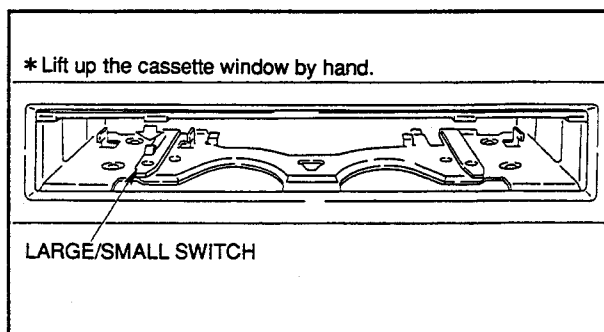
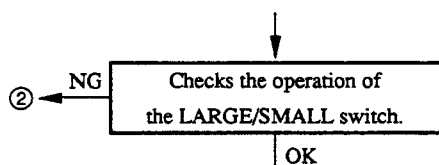
- Check that the cassette compartment is installed on the unit and harnesses are connected to the connectors on the cassette compartment.
- If any cassette compartment is not installed, install one. If any harness is not connected to the connectors, connect ones. Then, run the diagnosis.
- When pressing the YES (OK) switch, a cassette compartment sensor checks that a cassette compartment is installed or not. If the sensor decides that the cassette compartment is not installed, proceed to ①.

CASS-COMPARTMENT SENSOR  
DISCONTINUE DIAGNOSTICS,  
POWER OFF AND INSTALL  
A CASS-COMPARTMENT.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check that a cassette compartment is installed on the unit and harnesses are connected to the connectors.

Continues to the next page.



CASS-COMPARTMENT SENSOR  
CASSETTE SIZE SWITCH  
PRESS AND CHECK IT.

SMALL IN

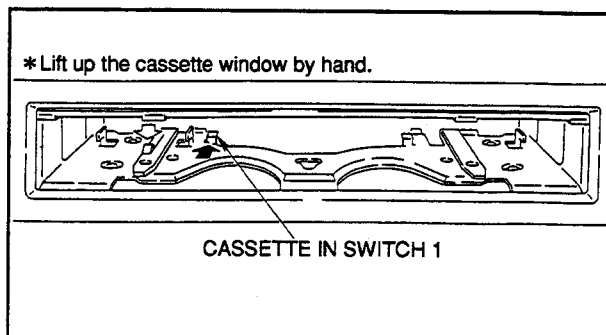
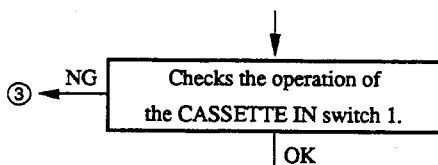
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

<How to decide>

	Not pressing by hand	Pressing by hand	Decision
Display	SMALL IN	LARGE IN	OK
	SMALL IN	SMALL IN	NG
	LARGE IN	LARGE IN	NG

NG ②





CASS-COMPARTMENT SENSOR

CASSETTE IN SWITCH1

PRESS AND CHECK IT.

SW1 (SW2)

OUT

NG : NO KEY

OK : YES KEY

PREVIOUS : (←) KEY

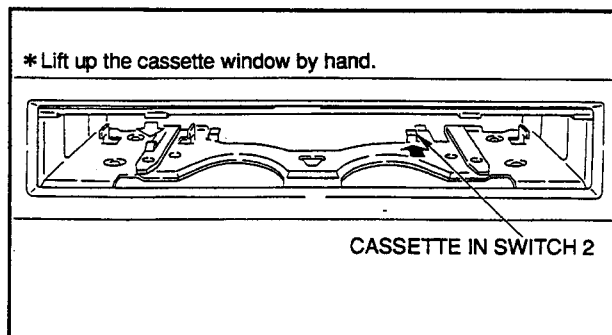
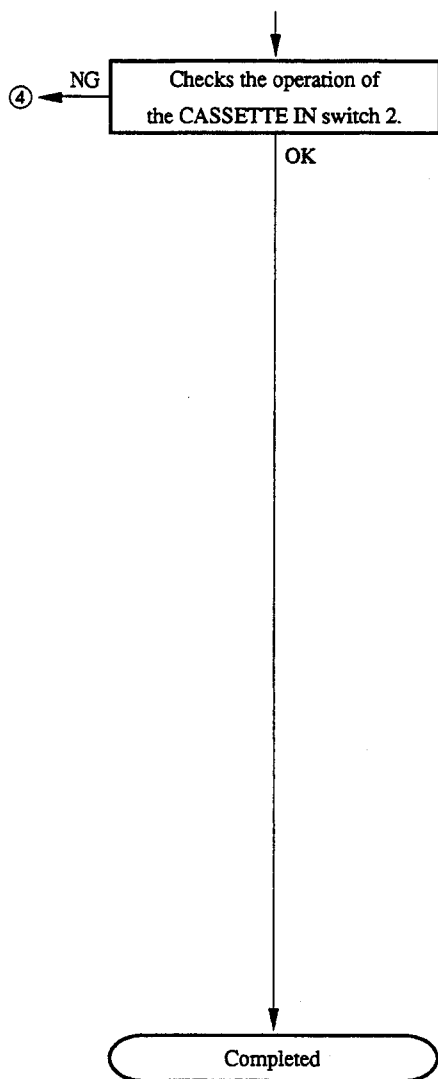
CANCEL : MENU KEY

<How to decide>

	Not pressing by hand	Pressing by hand	Decision
Display	OUT	IN	OK
	OUT	OUT	NG
	IN	IN	NG

NG ③

Continues to the next page.



CASS-COMPARTMENT SENSOR

CASSETTE IN SWITCH2

PRESS AND CHECK IT.

(SW1) SW2

OUT

NG : NO KEY

OK : YES KEY

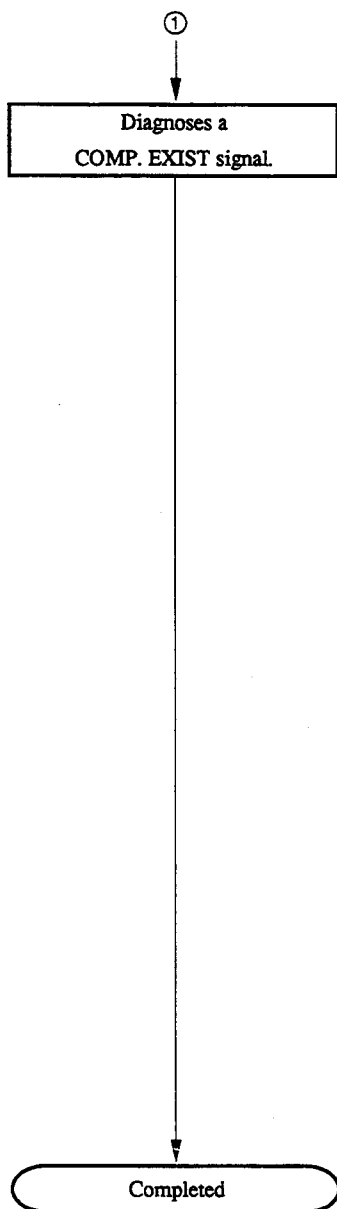
PREVIOUS : (←) KEY

CANCEL : MENU KEY

<How to decide>

	Not pressing by hand	Pressing by hand	Decision
Display	OUT	IN	OK
	OUT	OUT	NG
	IN	IN	NG

NG ④



- When a cassette compartment sensor decides that a cassette compartment is not installed, in spite that the cassette compartment is surely installed.

#### CASS-COMPARTMENT SENSOR

• CN930-6/CASS-COMP.  
~ GND  
IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Stop the diagnosis and turn off the power. Then, check that between pin 6 of CN930 on the CASS-COMP. and GND on the mechanical chassis is shorted by using a tester and so on.

After checking, turn on the power and continue the diagnosis.

#### CASS-COMPARTMENT SENSOR

• CN930-6/CASS-COMP.  
~ CN350-6/MS  
IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

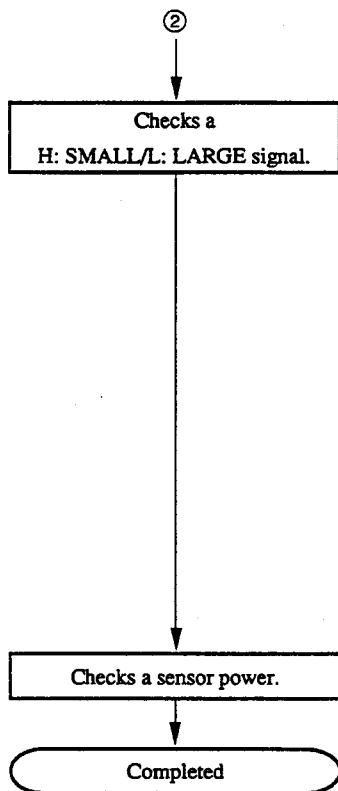
- CN350/MS-39 (L-5)

- Stop the diagnosis and turn off the power. Then, remove the DR board and check the connection by using a tester and so on.

After checking, install the DR board and turn on the power. Then, continue the diagnosis.

Shorted : YES key

Not shorted : No key



- With using both Auto (Input state of port) and Manual (Input of switch), continue the diagnosis.

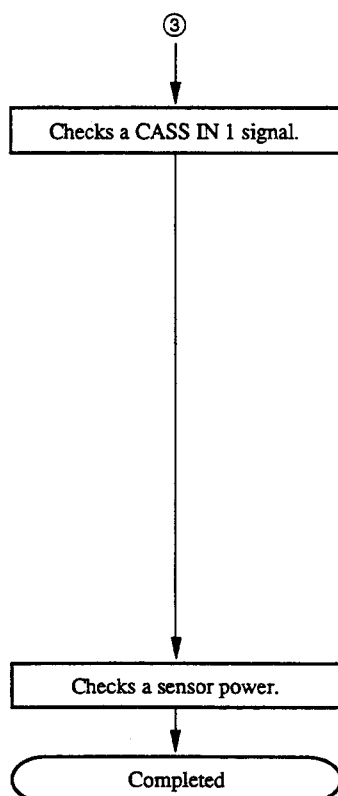
```

CASS-COMPARTMENT SENSOR
• CN930-1/CASS-COMP.
  ~ CN350-1/MS
IS THE POINTS SHORTED?

NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- CN350/MS-39 (L-5)

- Stop the diagnosis and turn off the power. Then, remove the DR board and check the connection by using a tester and so on.  
After checking, install the DR board and turn on the power. Then, continue the diagnosis.



- With using both Auto (Input state of port) and Manual (Input of switch), continue the diagnosis.

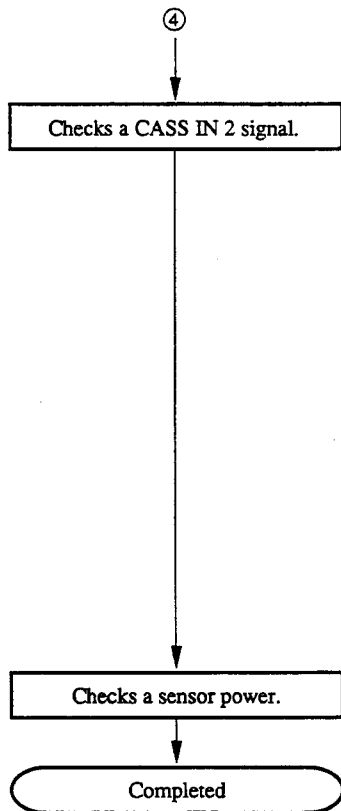
```

CASS-COMPARTMENT SENSOR
• CN930-2/CASS-COMP.
  ~ CN350-2/MS
IS THE POINTS SHORTED?

NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- CN350/MS-39 (L-5)

- Stop the diagnosis and turn off the power. Then, remove the DR board and check the connection by using a tester and so on.  
After checking, install the DR board and turn on the power. Then, continue the diagnosis.



- With using both Auto (Input state of port) and Manual (Input of switch), continue the diagnosis.

```

CASS-COMPARTMENT SENSOR

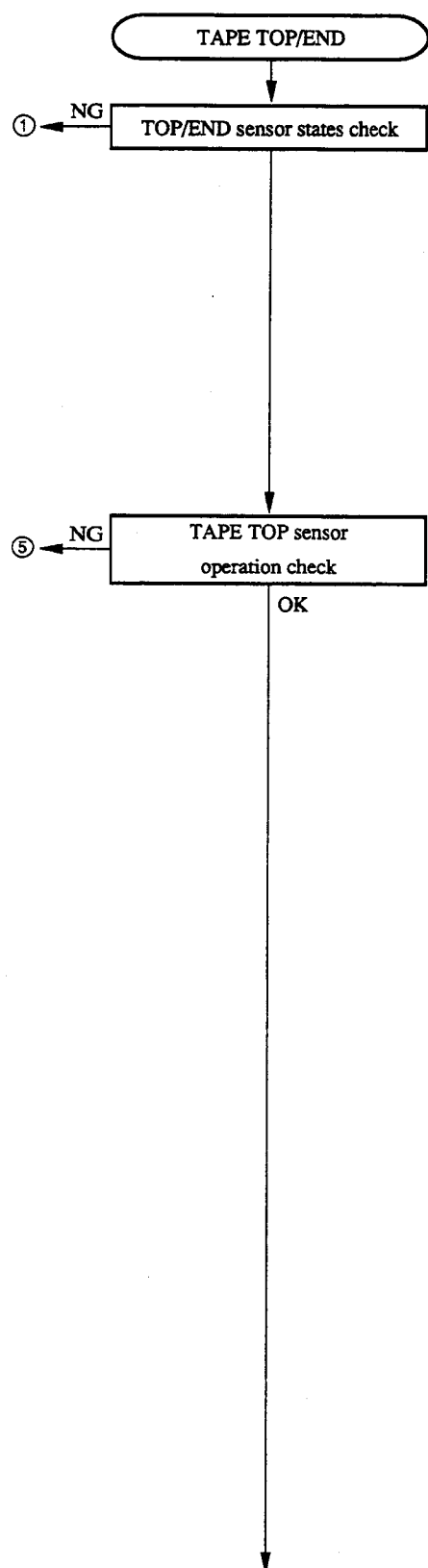
• CN930-3/CASS-COMP.
  ~ CN350-3/MS
IS THE POINTS SHORTED?

NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- CN350/MS-39 (L-5)

- Stop the diagnosis and turn off the power. Then, remove the DR board and check the connection by using a tester and so on.  
After checking, install the DR board and turn on the power. Then, continue the diagnosis.

### (3) TAPE TOP/END Diagnosis

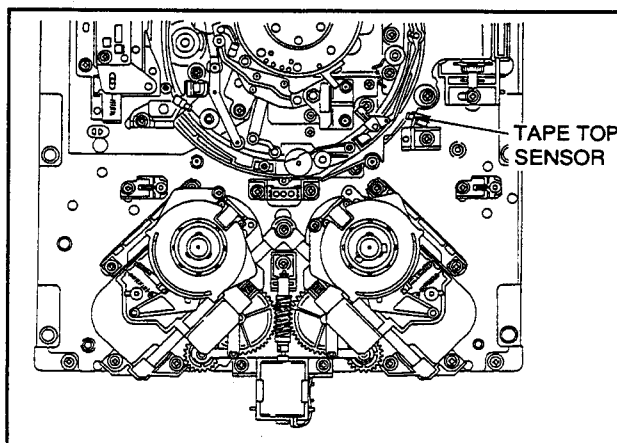


- The unit checks automatically.

```

TAPE TOP/END SENSOR
TAPE TOP/END SENSOR
NOW CHECKING ...

CANCEL : MENU KEY
  
```



- Close a screwdriver to the TAPE TOP sensor.

```

TAPE TOP/END SENSOR
TAPE TOP SENSOR
CHECK IT
WITH A SCREWDRIVER.

OFF

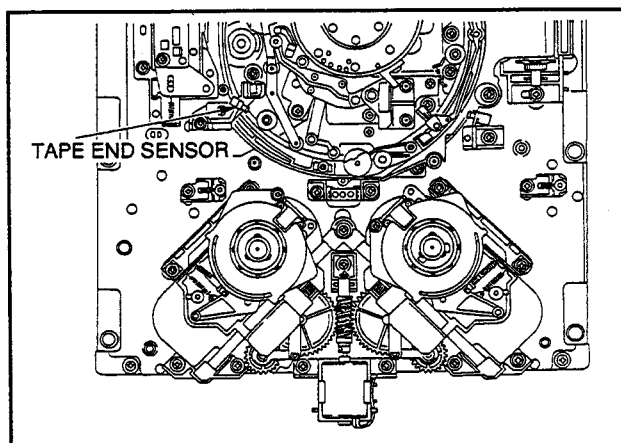
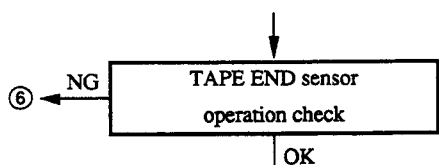
NG : NO KEY
OK : YES KEY
CANCEL : MENU KEY
  
```

#### <How to decide>

	Not touching a screwdriver to tape top sensor	Touching a screwdriver to tape top sensor	Decision
Display	OFF	ON	OK
	OFF	OFF	NG
	ON	ON	NG

NG ⑤

4-60(1800/1800P/1600/1600P)  
4-58(1400/1400P/1200/1200P)



- Close a screwdriver to the TAPE END sensor.

TAPE TOP/END SENSOR  
TAPE END SENSOR  
CHECK IT  
WITH A SCREWDRIVER.

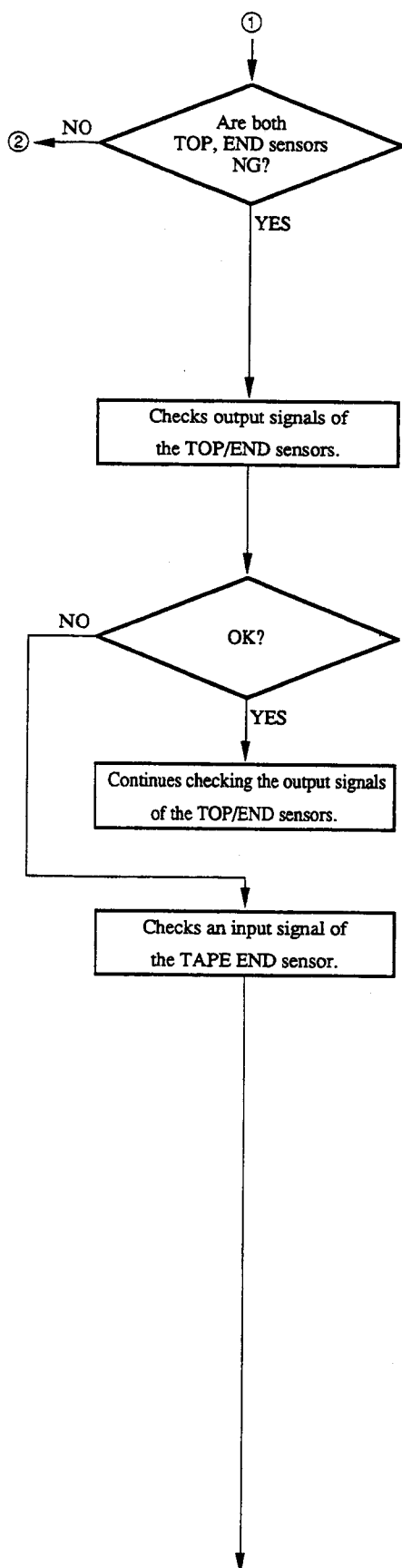
OFF

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (+) KEY  
CANCEL : MENU KEY

<How to decide>

	Not touching a screwdriver to tape end sensor	Touching a screwdriver to tape end sensor	Decision
Display	OFF	ON	OK
	OFF	OFF	NG
	ON	ON	NG

NG ⑥



4-62(1800/1800P/1600/1600P)  
4-60(1400/1400P/1200/1200P)

TAPE TOP/END SENSOR  
TAPE TOP/END SENSOR  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY

TAPE TOP/END SENSOR

• IC308-4/DR  
IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

A > 4 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

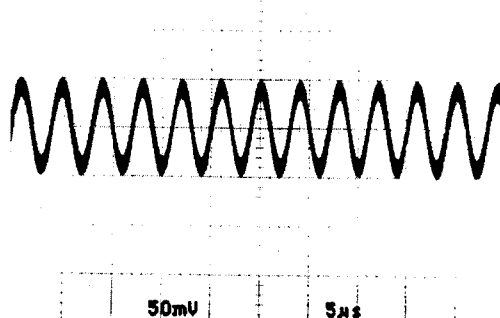
• IC308/DR-214 (E-5)

TAPE TOP/END SENSOR

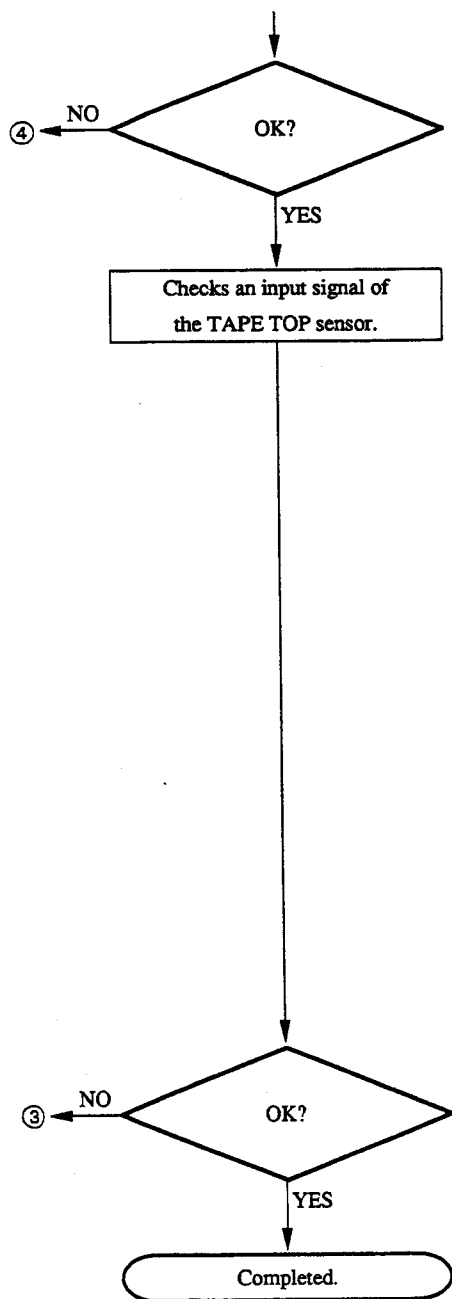
• CN301-30/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN301-30/DR-214 (C-5) waveform





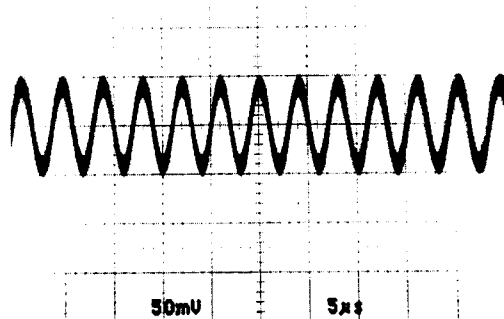


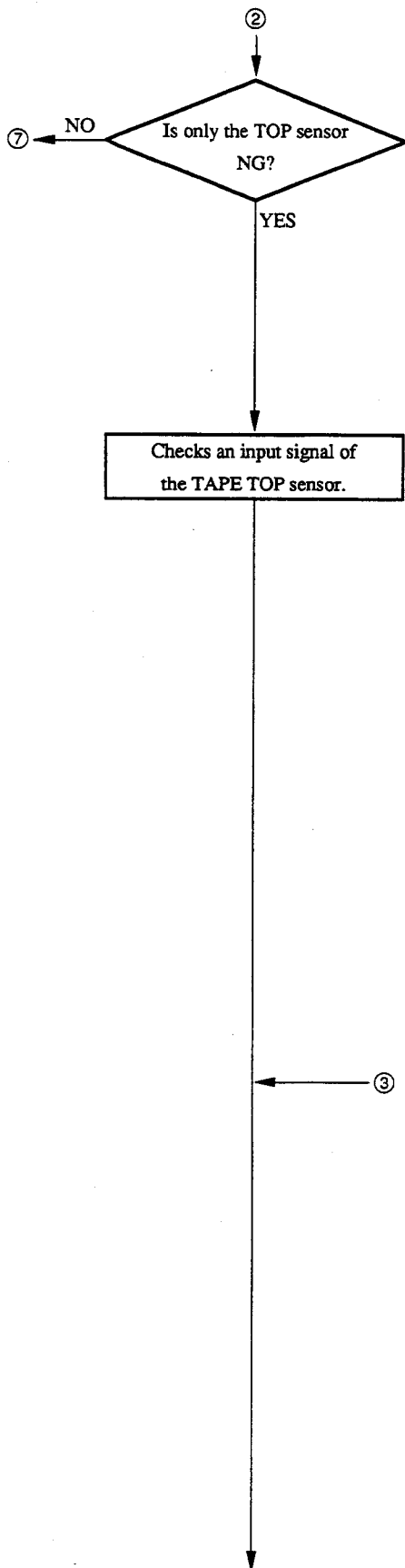
# TAPE TOP/END SENSOR

• CN302-19/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN302-19/DR-214 (H-5) waveform





TAPE TOP/END SENSOR

TAPE TOP SENSOR  
NO GOOD.

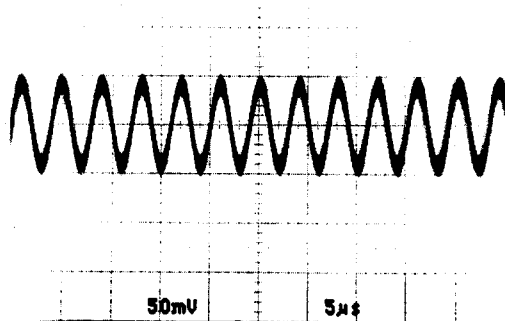
NEXT : (→) KEY  
CANCEL : MENU KEY

TAPE TOP/END SENSOR

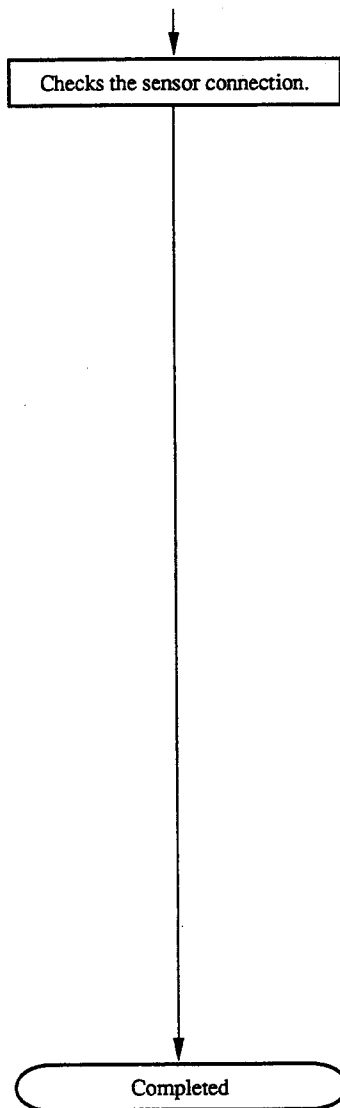
• CN302-19/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN302-19/DR-214 (H-5) waveform



4-64(1800/1800P/1600/1600P)  
4-62(1400/1400P/1200/1200P)



TAPE TOP/END SENSOR

- CN939-1/TOP SENSOR  
~ CN302-19/DR

IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN302/DR-214 (H-5)

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.

After checking, turn on the power and continue the diagnosis.

TAPE TOP/END SENSOR

- CN939-2/TOP SENSOR  
~ CN302-18/DR

IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN302/DR-214 (H-5)

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.

After checking, turn on the power and continue the diagnosis.

⑦

Checks an input signal of  
the TAPE END sensor.

TAPE TOP/END SENSOR

TAPE END SENSOR  
NO GOOD.

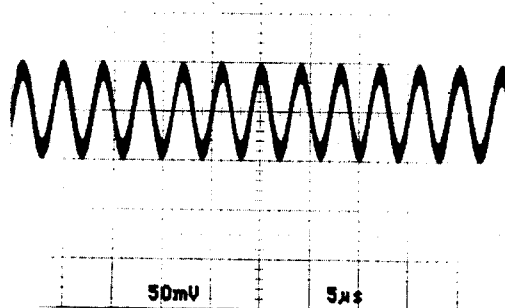
NEXT : (→) KEY  
CANCEL : MENU KEY

TAPE TOP/END SENSOR

• CN301-30/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN301-30/DR-214 (C-5) waveform



④

4-66(1800/1800P/1600/1600P)  
4-64(1400/1400P/1200/1200P)

Checks the sensor connection.

TAPE TOP/END SENSOR

- CN938-1/END SENSOR  
~ CN301-30/DR

IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN301/DR-214 (C-5)

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.

After checking, turn on the power and continue the diagnosis.

TAPE TOP/END SENSOR

- CN938-2/END SENSOR  
~ CN301-29/DR

IS THE POINTS SHORTED?

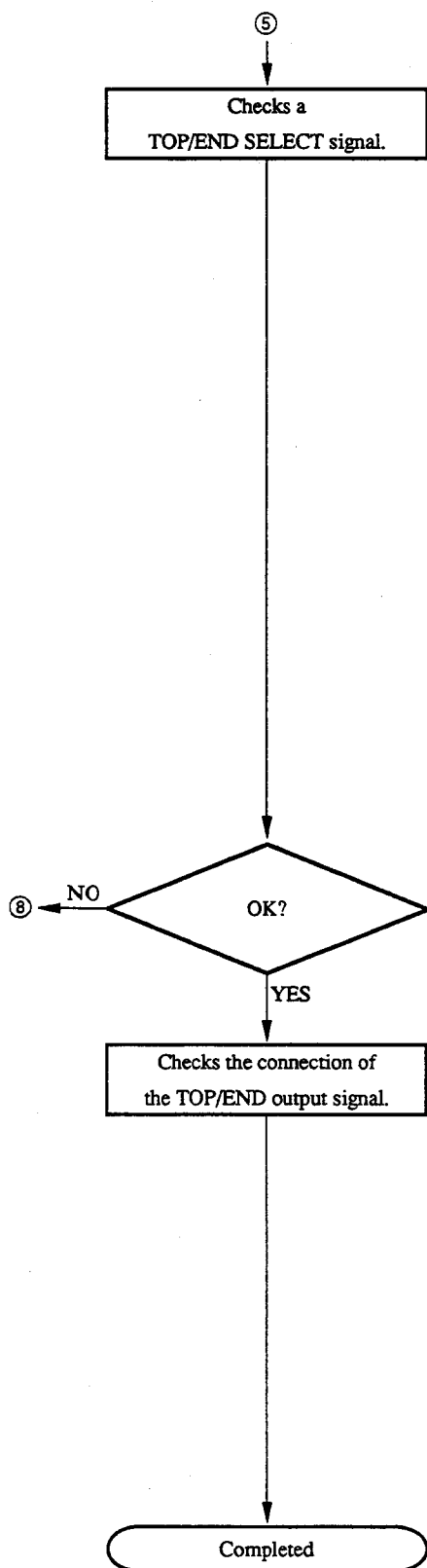
NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN301/DR-214 (C-5)

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.

After checking, turn on the power and continue the diagnosis.

Completed



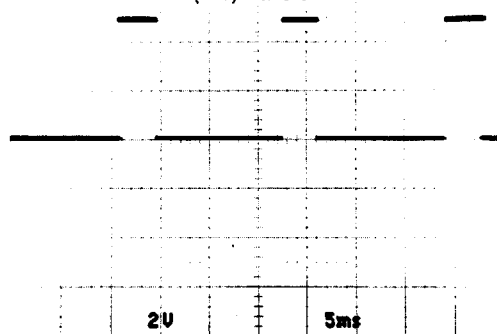
TAPE TOP/END SENSOR

- IC308-3/DR

CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC308-3/DR-214 (E-5) waveform



TAPE TOP/END SENSOR

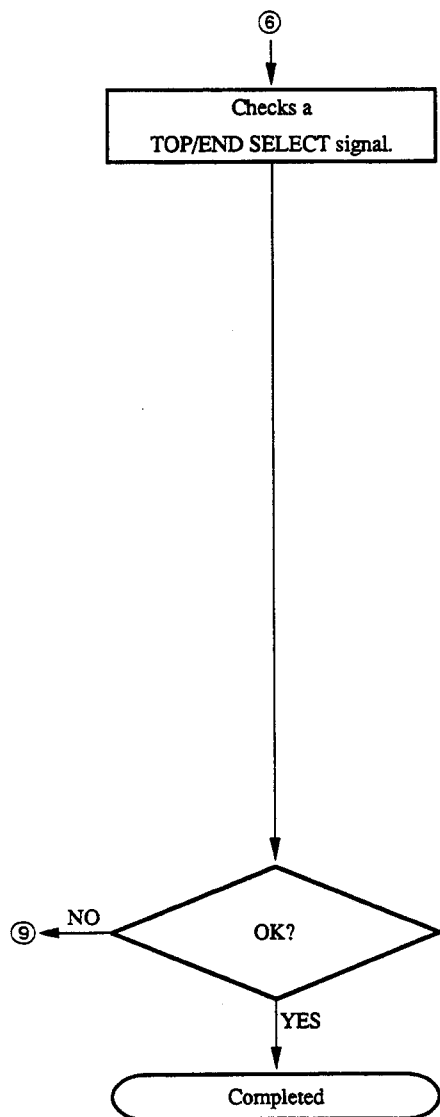
- CN300-37B/DR  
~ CN108-14B/SS

IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN300/DR-214 (H-1)
- CN108/SS-53 (K-6)

- Turn off the power. Then, check the connection using by a tester and so on.  
After checking, turn on the power and continue the diagnosis.

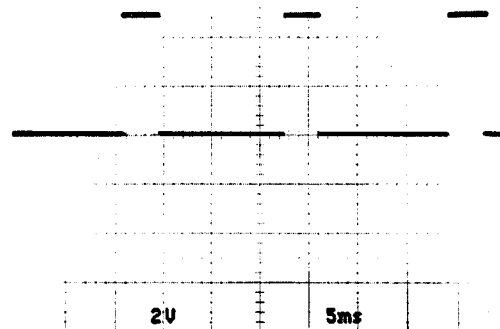


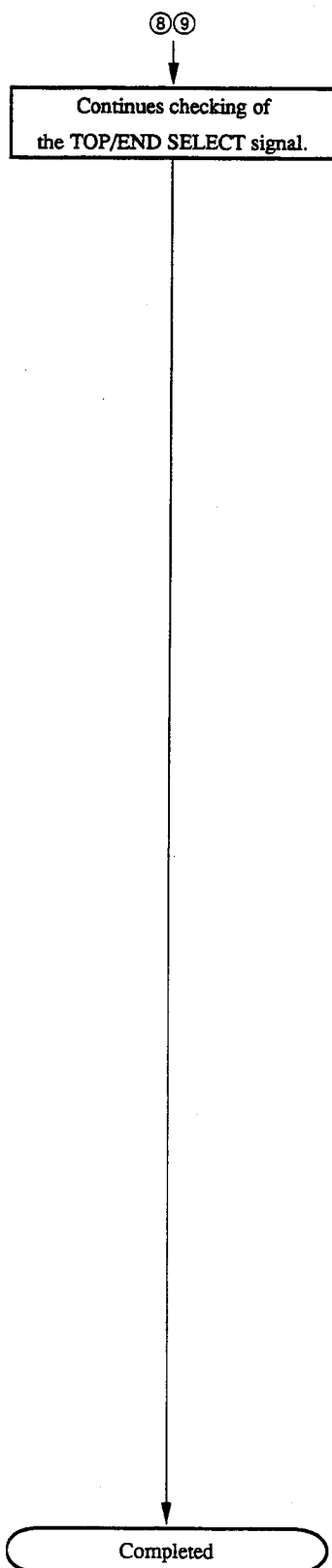
TAPE TOP/END SENSOR

- IC308-3/DR  
CHECK THE WAVE FORM ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (+) KEY  
CANCEL : MENU KEY

• IC308-3/DR-214 (E-5) waveform



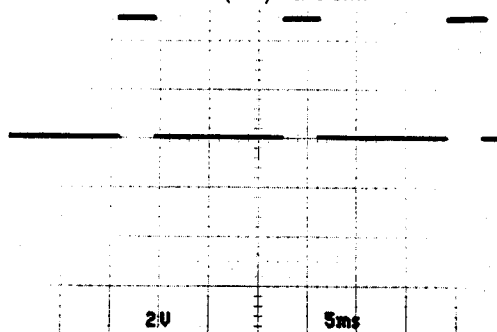


# TAPE TOP/END SENSOR

- CN300-22B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN300-22B/DR-214 (H-1) waveform

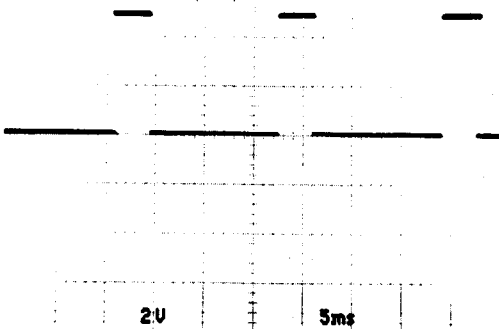


# TAPE TOP/END SENSOR

- CN108-7A/SS  
CHECK THE WAVE FORM  
ON THE POINT.

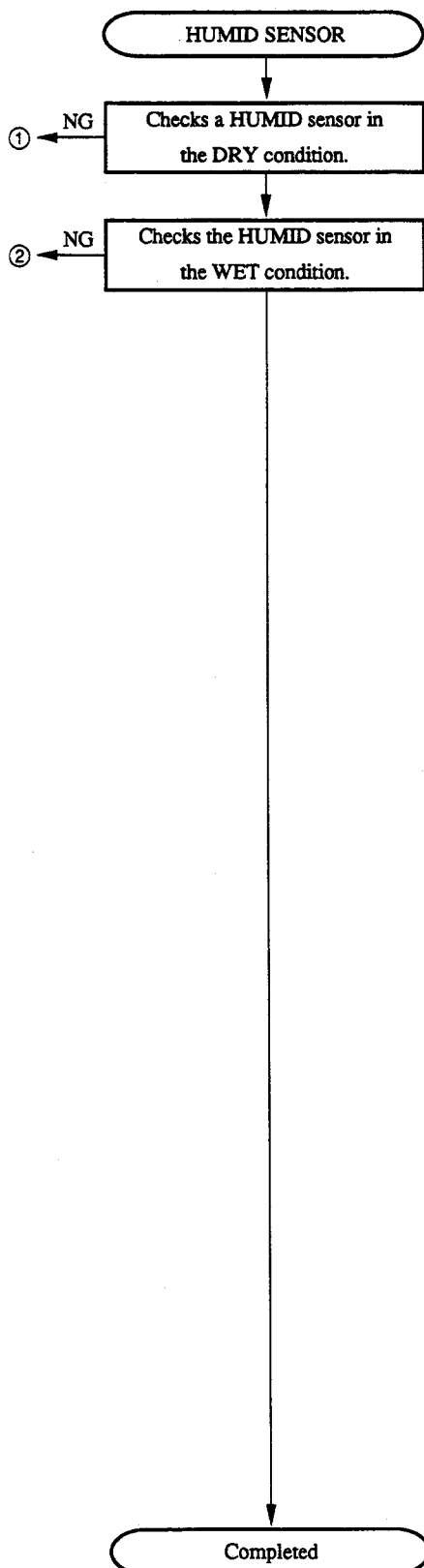
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN108-7A/SS-53 (K-6) waveform





#### (4) HUMID Diagnosis



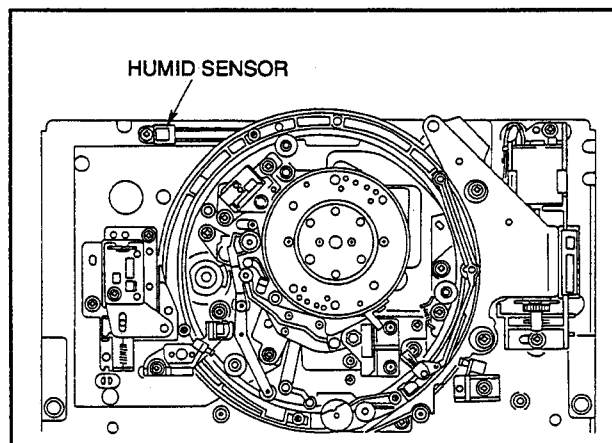
- The unit checks automatically.

```

HUMID(MOISTURE)
CHECK THE HUMID SENSOR
WITH WATER.

DRY

NG : NO KEY
OK : YES KEY
CANCEL : MENU KEY
  
```



Note : Be sure to use water.

It takes a little to be responded.

```

HUMID(MOISTURE)
WAIT UNTIL 'DRY'.

PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- After moistening the SENSOR with water, it takes a lot of time to be dry.  
In the case that the above is displayed, wait until the sensor becomes dry and the display changes to DRY, or turn off the power and dry the SENSOR.

①  
↓  
Checks the operation of the circuit.

NG

Checks the connection of  
a DEW DET (X) signal.

OK

Checks the connection of  
a DEW DET (Y) signal.

OK

#### HUMID (MOISTURE)

IS 'DRY' DISPLAYED WHEN  
SHORTENING CN263-1/MB  
TO CN263-2/MB?

DRY

NG : NO KEY  
OK : YES KEY  
CANCEL : MENU KEY

- CN263/MB-471 (A-3) \* UVW-1200/1200P: CN234

- When the above two pins are shorted, this unit is designed so that the circuit becomes DRY.

#### HUMID (MOISTURE)

• CN263-1/MB  
~ CN109-21A/SS  
IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (+) KEY  
CANCEL : MENU KEY

- CN263/MB-471 (A-3) \* UVW-1200/1200P: CN234  
CN109/SS-53 (C-6)

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.  
After checking, turn on the power and continue the diagnosis.

#### HUMID (MOISTURE)

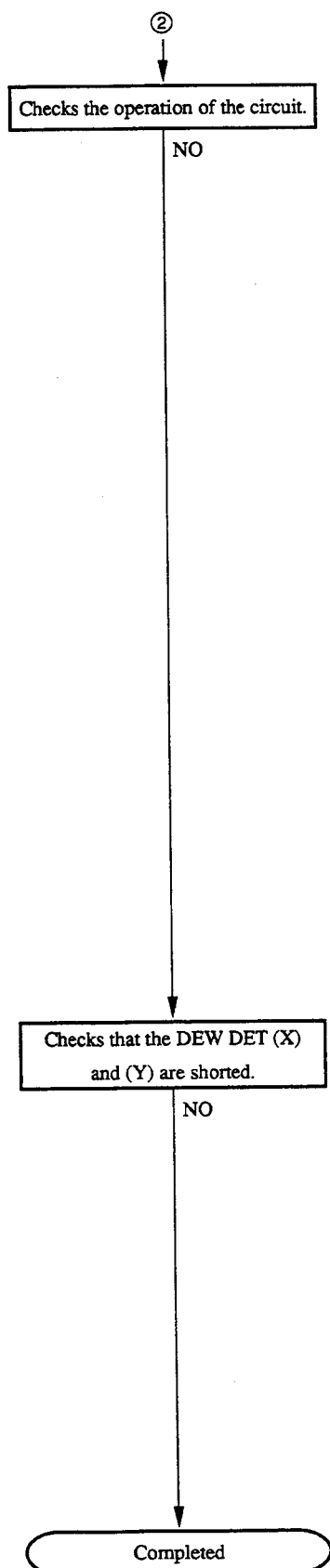
• CN263-2/MB  
~ CN109-21B/SS  
IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (+) KEY  
CANCEL : MENU KEY

- CN263/MB-471 (A-3) \* UVW-1200/1200P: CN234  
CN109/SS-53 (C-6)

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.  
After checking, turn on the power and continue the diagnosis.

- The probable cause is that a DEW COMPARATOR on the SS board is defective.



HUMID(MOISTURE)  
CN263/MB  
REMOVE THE CONNECTOR.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN263/MB-471 (A-3) \* UVW-1200/1200P: CN234

- Disconnect a harness from the connector on the MB board.  
After disconnecting, press the (→) key.

HUMID(MOISTURE)  
CN263/MB  
INSERT THE CONNECTOR.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN263/MB-471 (A-3) \* UVW-1200/1200P: CN234

- Connect the disconnected harness to its original position.  
After connecting, press the (→) key.

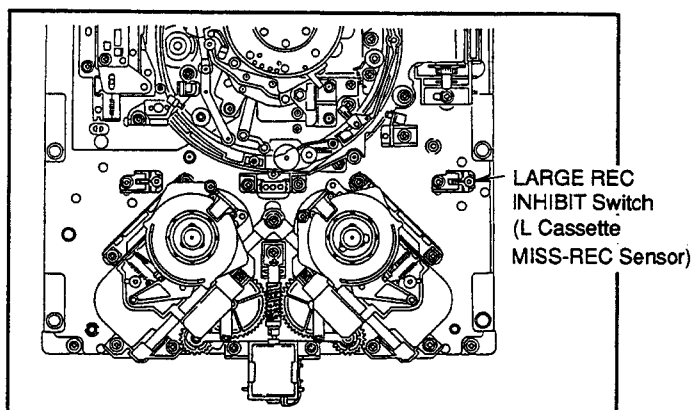
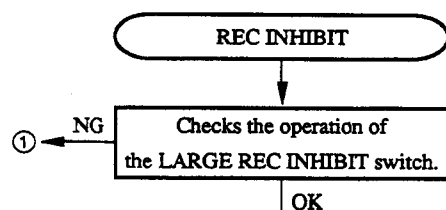
HUMID(MOISTURE)  
• CN263-1/MB  
~ CN263-2/MB  
IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN263/MB-471 (A-3) \* UVW-1200/1200P: CN234

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.  
After checking, connect the connector CN263 (CN234 for UVW-1200/1200P) to the MB board and turn on the power. Then, continue the diagnosis.

(5) REC INHIBIT Diagnosis



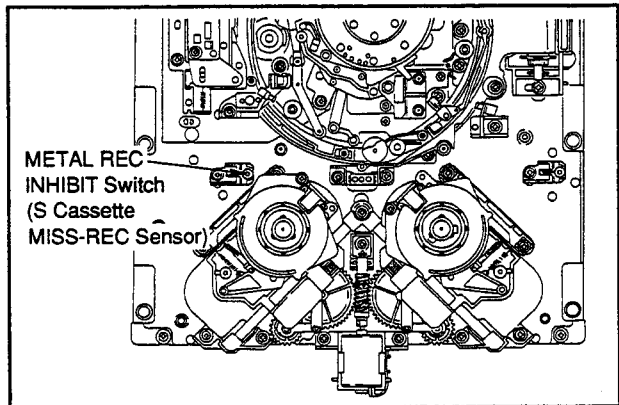
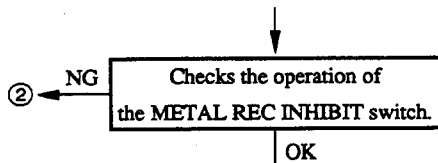
REC INHIBIT SENSOR  
LARGE REC INHIBIT SWITCH  
PRESS AND CHECK IT.  
ON  
NG : NO KEY  
OK : YES KEY  
CANCEL : MENU KEY

<How to decide>

	Not pressing by hand	Pressing by hand	Decision
Display	ON	OFF	OK
	ON	ON	NG
	OFF	OFF	NG

NG ①

4-74 (1800/1800P/1600/1600P)  
4-72 (1400/1400P/1200/1200P)



REC INHIBIT SENSOR  
METAL REC INHIBIT SWITCH  
PRESS AND CHECK IT.

ON

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

<How to decide>

	Not pressing by hand	Pressing by hand	Decision
Display	ON	OFF	OK
	ON	ON	NG
	OFF	OFF	NG

NG ②

Continues to the next page.

Checks the installation of  
the MS board.

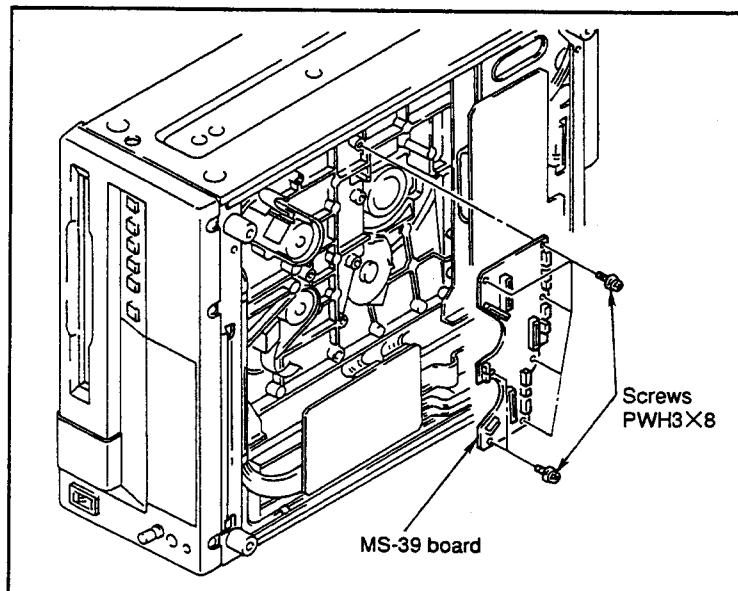
REC INHIBIT SENSOR  
MS BOARD  
CHECK INSTLLATION.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

REC INHIBIT SENSOR  
MS BOARD  
INSTALL IT AGAIN.

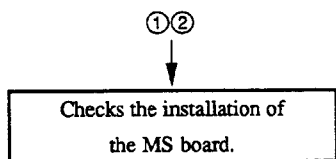
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• Installation of the MS-39 board



**Check :** The all seven screws (PWH3×28) should be tightened.  
There should not be clearance between the MS board and the mechanical parts.

Completed



REC INHIBIT SENSOR

MS BOARD

CHECK INSTLLATION.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (+) KEY  
CANCEL : MENU KEY

REC INHIBIT SENSOR

MS BOARD

INSTALL IT AGAIN.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

REC INHIBIT SENSOR

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 LARGE REC INH. SENSOR  
2 MS BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

REC INHIBIT SENSOR

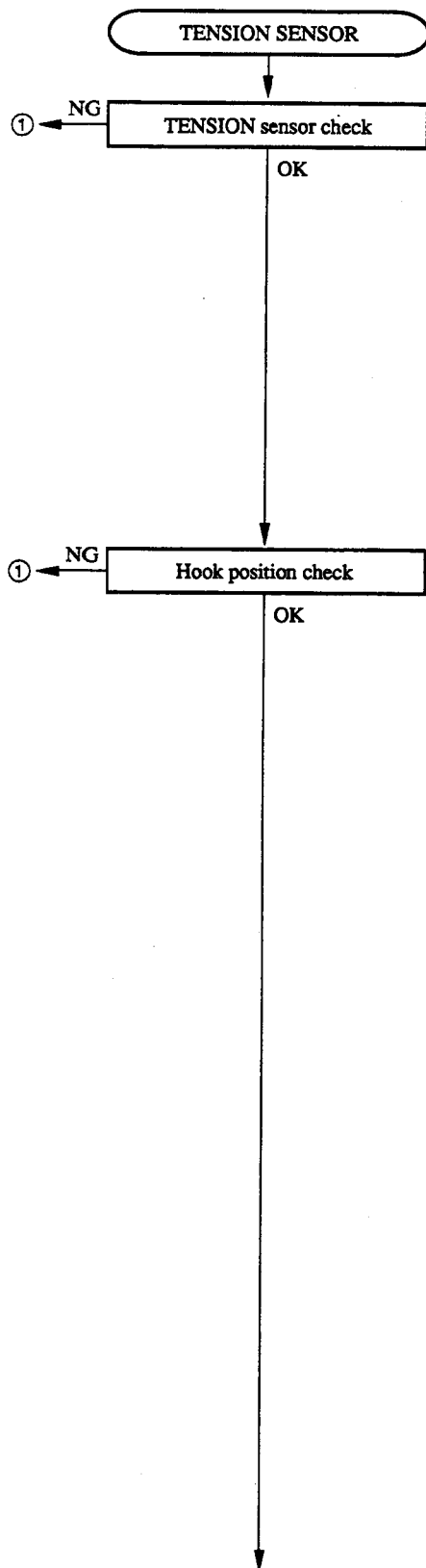
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 METAL REC INH. SENSOR  
2 MS BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

Completed

(6) TENSION SENSOR Diagnosis



```

TENSION SENSOR
TENSION SENSOR
NOW CHECKING ...

CANCEL : MENU KEY
  
```

- Threading is automatically performed. Check that the output of a tension sensor is changed.

```

TENSION SENSOR

DISCONTINUE DIAGNOSTICS,
POWER OFF AND REMOVE
A CASS-COMPARTMENT.

PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- Stop the diagnosis and turn off the power. Then, remove a cassette compartment. After removing, turn on the power and continue the diagnosis.

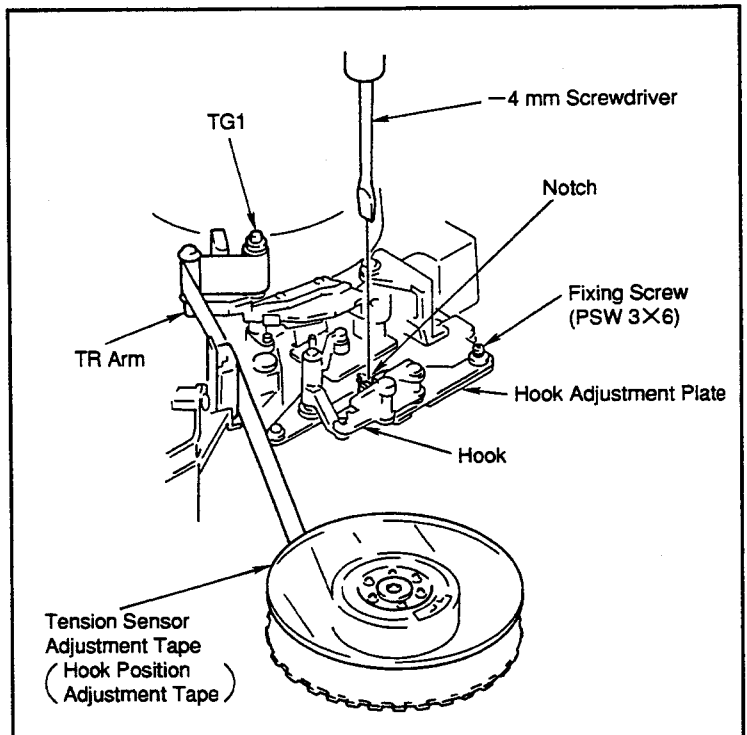
4-78(1800/1800P/1600/1600P)  
 4-76(1400/1400P/1200/1200P)



# TENSION SENSOR

FIT THE HOOK-POSITION-  
ADJUSTMENT-TAPE INTO  
S-REEL AND TG-1

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



- Put the reel of the tension sensor adjustment tape on the S reel table. Then, hook the loop of the tape-top on the TG-1.  
Place the tape in the tape path condition as shown in the figure.

# TENSION SENSOR

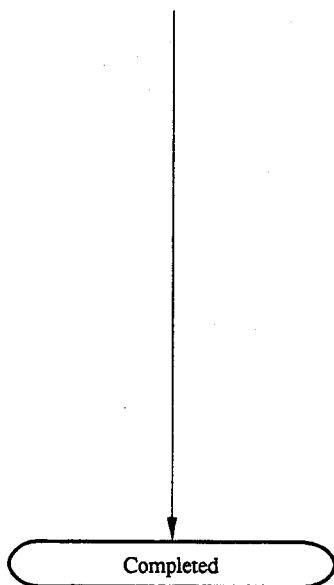
CHECK THE DISPLAY  
INDICATING AN 'OK'?

OK

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check the the display is OK.

Continues to the next page.



TENSION SENSOR

TEN. REGULATOR ASSEMBLY  
READJUST OR CHANGE IT.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- In case of re-adjustment, refer to section 6-38-1 and 6-38-2 in Service Manual Vol. 1.

In case of replacement, refer to section 6-36 in Service Manual Vol. 1.

After adjustment, be sure to save the data in the non-volatile RAM.

TENSION SENSOR

DISCONTINUE DIAGNOSTICS,  
POWER OFF AND INSTALL  
A CASS-COMPARTMENT.

CANCEL : MENU KEY

- Stop the diagnosis and turn off the power. Then, install the cassette compartment.

①

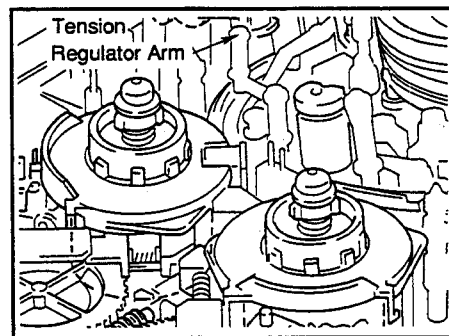
Checks an output signal of  
the S TENSION AMP.

NG

TENSION SENSOR

TENSION SENSOR  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY



TENSION SENSOR

• CN108-11A/SS  
DOES THE OUTPUT VARY  
WHEN THE TR ARM  
IS MOVED SLOWLY?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN108/SS-53 (K-6)

TENSION SENSOR

• CN300-30B/DR  
DOES THE OUTPUT VARY  
WHEN THE TR ARM  
IS MOVED SLOWLY?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

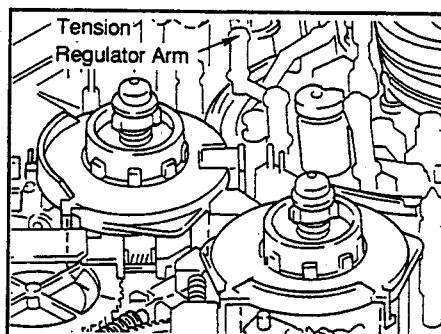
• CN300/DR-214 (H-1)

- Using an oscilloscope and so on, check the voltage at the displayed point is changed by moving the tension regulator arm lightly.  
At this time, be careful not to damage the tension regulator arm.

Continues to the next page.

4-81 (1800/1800P/1600/1600P)  
4-79 (1400/1400P/1200/1200P)

Checks an input signal of  
the S TENSION.



TENSION SENSOR

- CN302-11/DR  
DOES THE OUTPUT VARY  
MORE THAN 5mV WHEN THE  
TR ARM IS MOVED SLOWLY?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN302/DR-214 (H-5)

TENSION SENSOR

- CN302-12/DR  
DOES THE OUTPUT VARY  
MORE THAN 5mV WHEN THE  
TR ARM IS MOVED SLOWLY?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

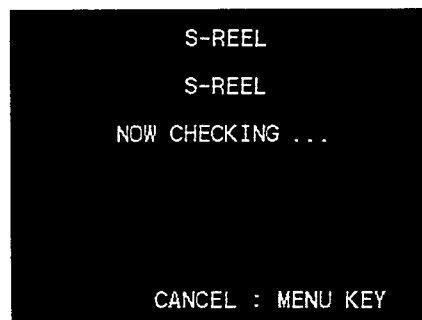
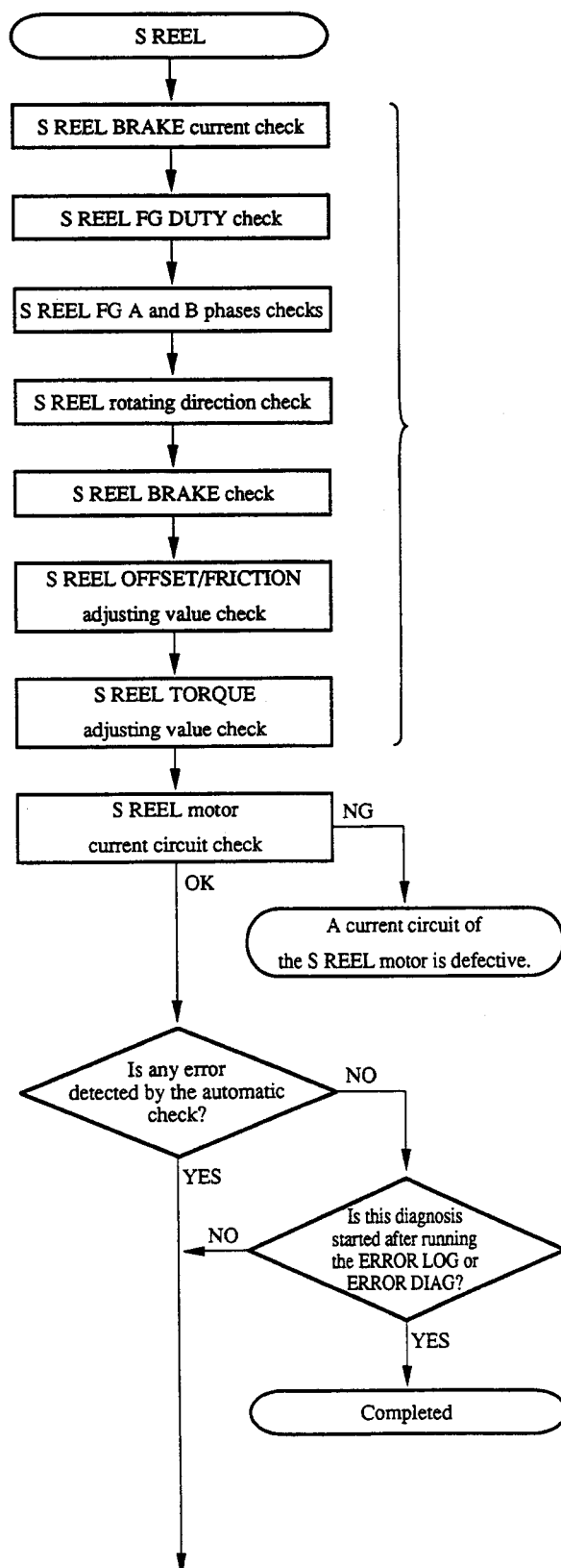
• CN302/DR-214 (H-5)

- Using an oscilloscope and so on, check the voltage at the displayed point is changed by moving the tension regulator arm lightly.  
At this time, be careful not to damage the tension regulator arm.

Checks a ADJUST +5 V signal.

Completed

(7) S REEL Diagnosis



- The unit checks automatically.

- If the automatic check is completed at this step, after running the ERROR LOG or ERROR DIAG, the check is completed. Then, the diagnosis is proceeded to the next step.

Continues to the next page.

Checks the clearance of  
the S REEL BRAKE.

NG

S-REEL  
BRAKE CLEARANCE  
CHECK IT.

NG : NO KEY  
OK : YES KEY  
CANCEL : MENU KEY

- Refer to section 6-13-1 in Service Manual Vol. 1.

S-REEL  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 S BRAKE LINING  
2 RS TABLE ASSEMBLY (S)

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Refer to sections 6-8 and 6-13 in Service Manual Vol. 1.

Checks the current of  
the S REEL BRAKE.

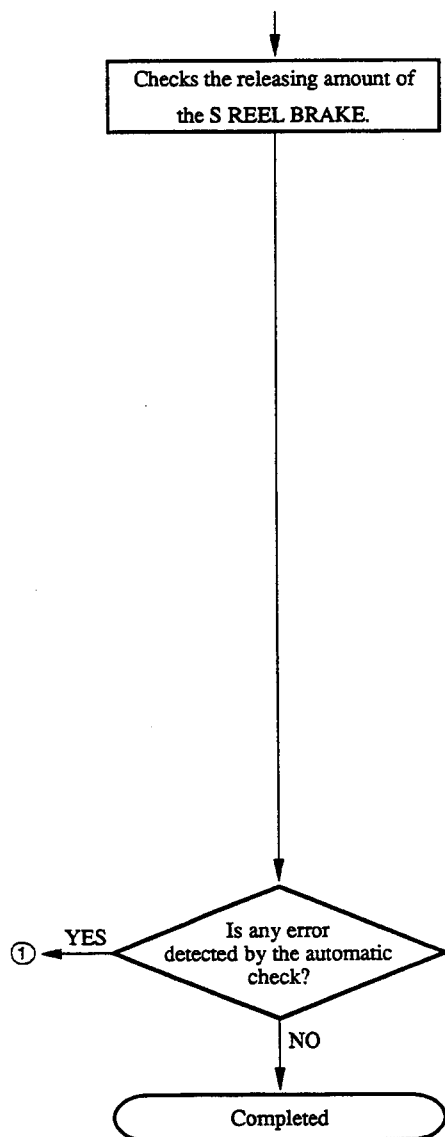
NG

OK

The current of  
the S REEL BRAKE is defective.

- The unit checks the current of the reel brake plunger automatically.

4-84 (1800/1800P/1600/1600P)  
4-82 (1400/1400P/1200/1200P)



S-REEL  
BRAKE RELEASING AMOUNT  
CHECK IT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

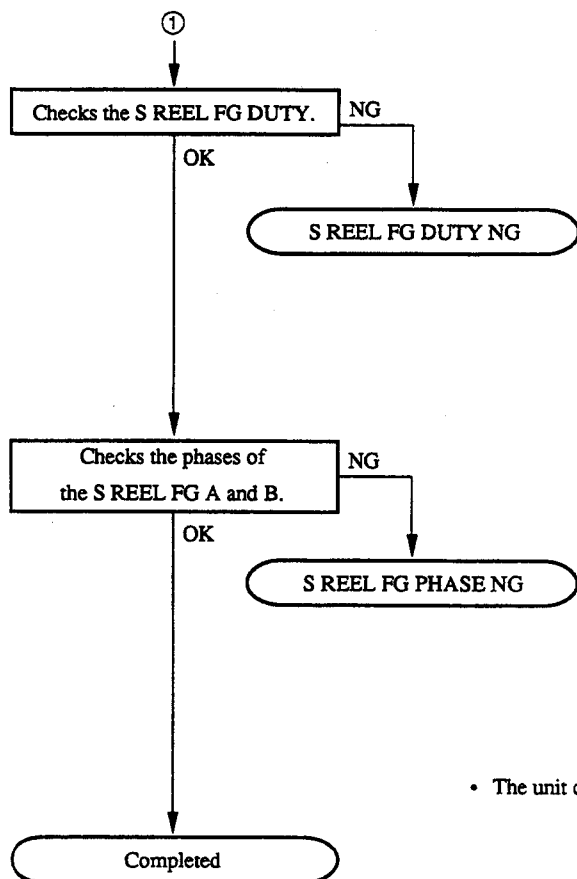
- Refer to section 6-13-2 in Service Manual Vol. 1.

S-REEL  
FOLLOWING PART IS  
DEFECTIVE.

• RS TABLE ASSEMBLY (S)

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Refer to section 6-8 in Service Manual Vol. 1.



S-REEL  
S REEL FG DUTY  
NOW CHECKING ...  
  
CANCEL : MENU KEY

S-REEL  
S REEL FG PHASE  
NOW CHECKING ...  
  
CANCEL : MENU KEY

- The unit checks automatically and searches a defective device.

A current circuit of the S REEL motor is defective.

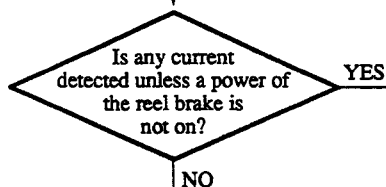
S-REEL  
S REEL MOTOR CURRENT  
NO GOOD.  
  
NEXT : (→) KEY  
CANCEL : MENU KEY

S-REEL  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 SS BOARD  
1 ADJUST +5V LINE  
  
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that an error occurs around an A/D converter for detecting the S reel current.



The current of  
the S REEL BRAKE is defective.



S-REEL  
S REEL BRAKE CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

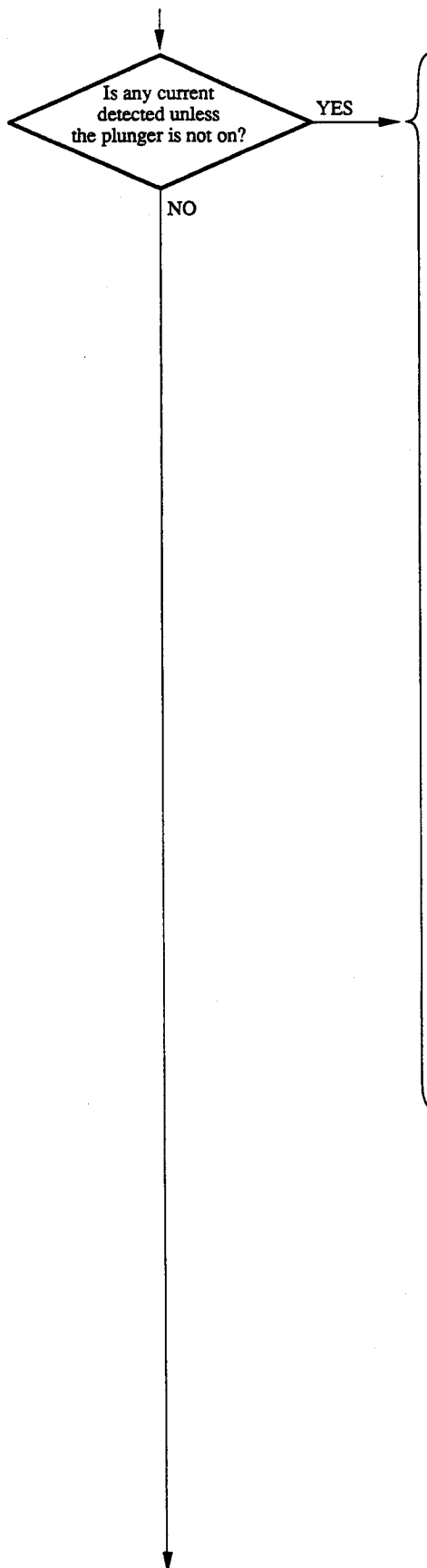
S-REEL  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 DR BOARD  
2 SS BOARD  
3 CONNECTION(DR-SS)

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that the current detecting circuit is defective.

Continues to the next page.

4-87 (1800/1800P/1600/1600P)  
4-85 (1400/1400P/1200/1200P)



S-REEL  
S REEL BRAKE CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 MS BOARD  
2 DR BOARD  
3 RM-126 BOARD  
3 PD-35 BOARD  
CONTINUED...

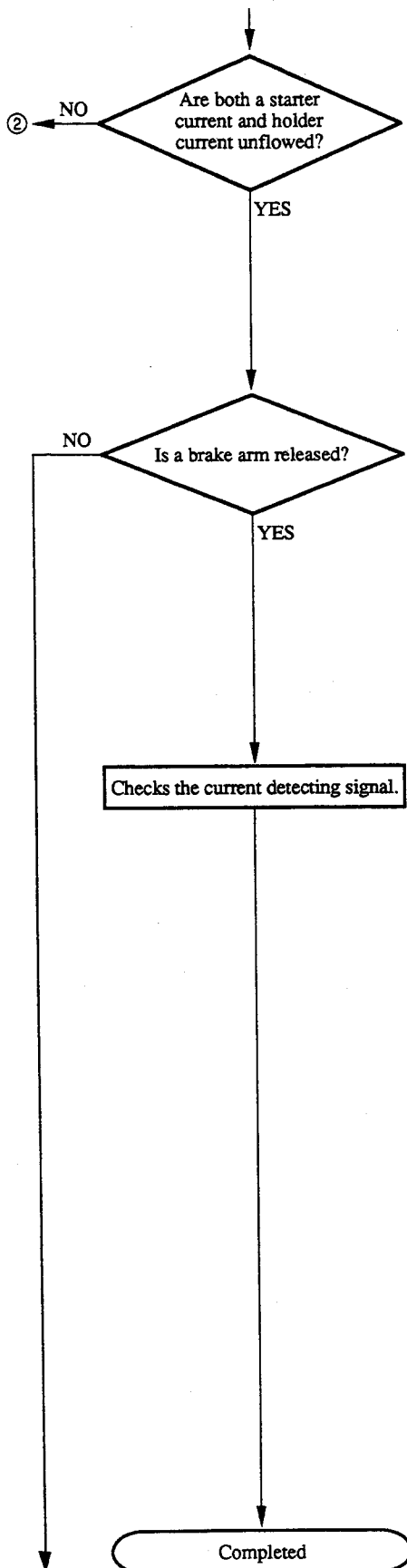
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
3 PINCH PLUNGER  
3 S-REEL BRAKE PLUNGER  
3 UNREG +12V LINE

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- One probable cause is that any current is flowed by the cause such as shoring of the signal line.

The other is that pinch plunger system is defective, because the current detecting circuit is used for both S reel brake and pinch plunger.



S-REEL

S REEL BRAKE CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL

DOES THE REEL BRAKE  
RELEASE?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check that the reel brake is released or not.

S-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 CONNECTION(DR-SS)  
2 SS BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is the faulty connections of connectors or a break in the signal line on the SS board.

S-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

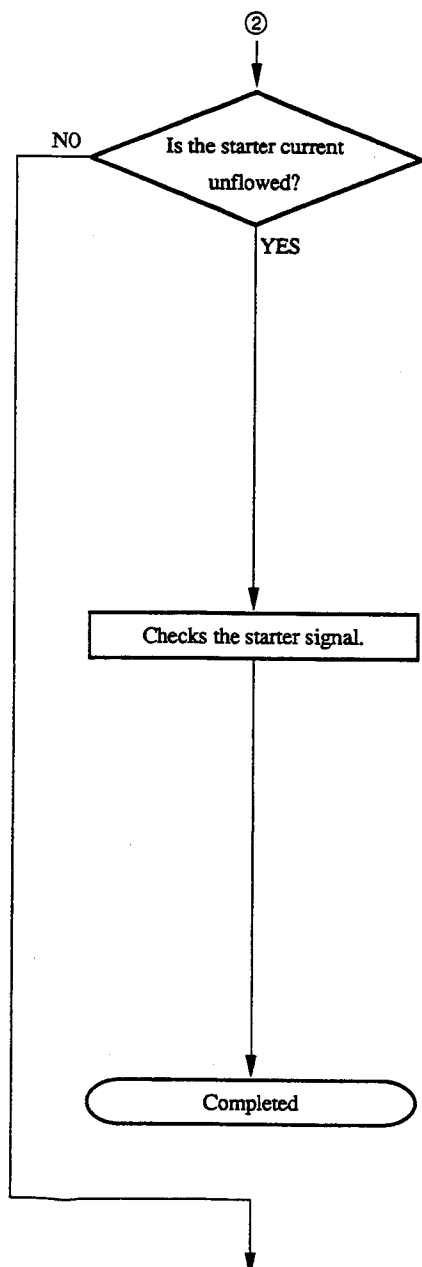
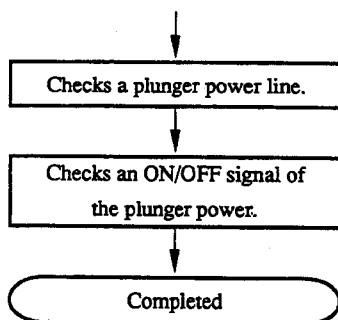
1 DR BOARD  
2 SS BOARD  
3 MB BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that the current detecting circuit on the DR board is defective or a SOL. CURRENT signal is shorted on the SS, MB or DR board.

Continues to the next page.

4-89 (1800/1800P/1600/1600P)  
4-87 (1400/1400P/1200/1200P)



S-REEL

S BRAKE STARTER CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

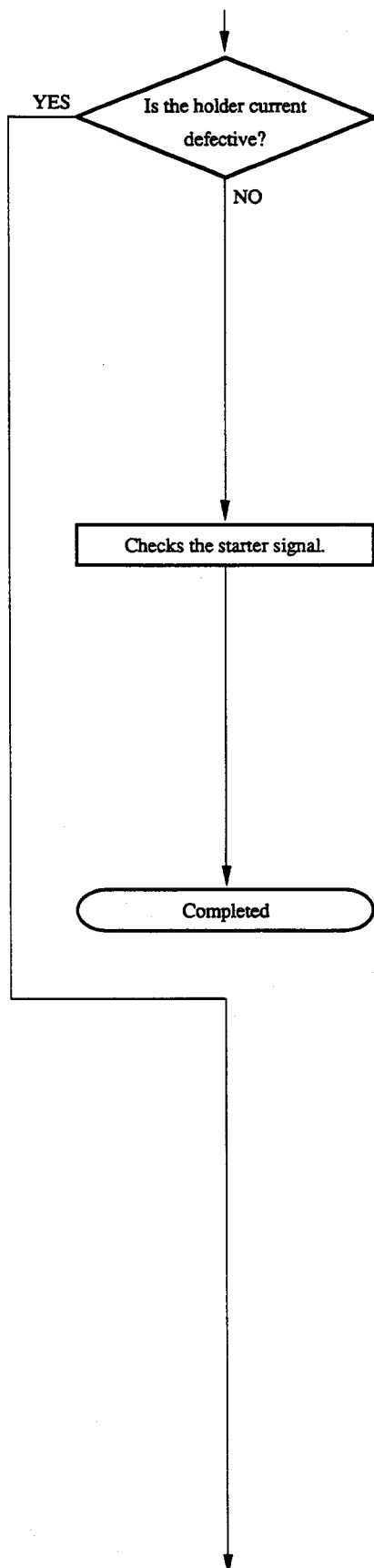
S-REEL

• CN949-2/RM-126  
IS LOW PULSE DETECTED  
WHILE PRESSING (↑)KEY?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check that about 300 msec pulse is occurred every a second, while pressing the (↑) key.
- Check that the voltage is more than 10 V, while not pressing the (↑) key.

4-90 (1800/1800P/1600/1600P)  
4-88 (1400/1400P/1200/1200P)



S-REEL

S BRAKE HOLDER CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL

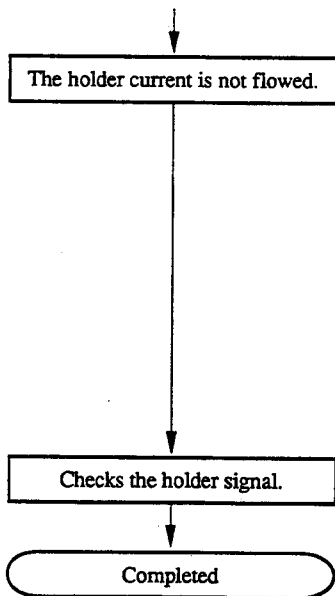
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 MS BOARD  
2 PM-126 BOARD  
3 S-REEL BRAKE PLUNGER

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The starter continues operating.

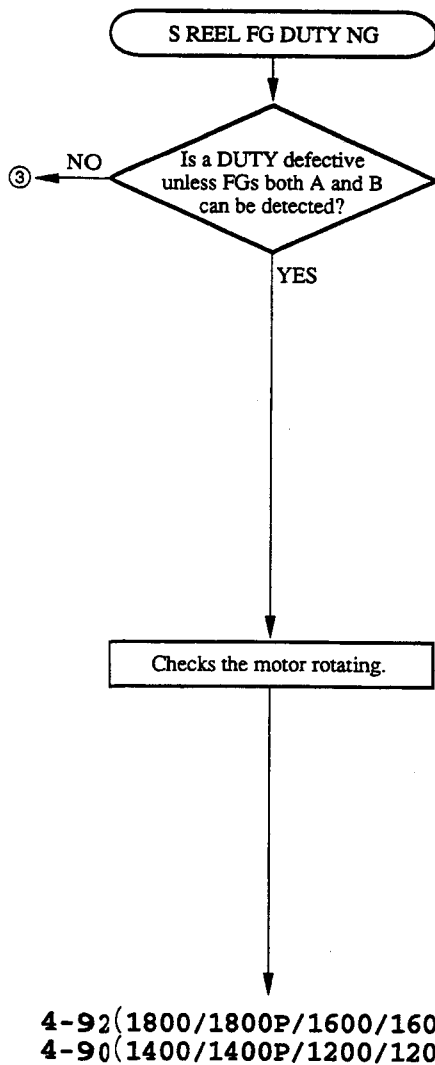
Continues to the next page.



S-REEL

S BRAKE HOLDER CURRENT  
NO GOOD.

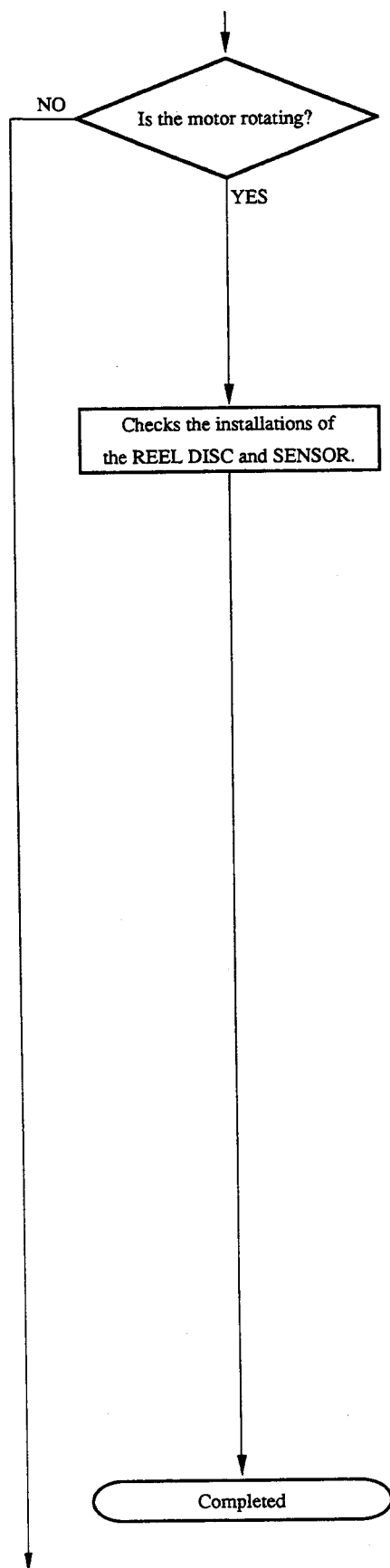
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



S-REEL

S REEL FG DUTY  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



S-REEL

S-REEL  
IS THE MOTOR ROTATING?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL

REEL DISC & SENSOR  
CHECK INSTLLATION.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Refer to section 6-7 in Service Manual Vol. 1.

S-REEL

REEL DISC & SENSOR  
READJUST OR CHANGE IT.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Refer to section 6-7 in Service Manual Vol. 1.

S-REEL

FOLLOWING PART IS  
DEFECTIVE.

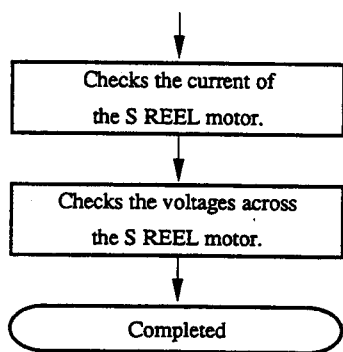
• S REEL FG SENSOR

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

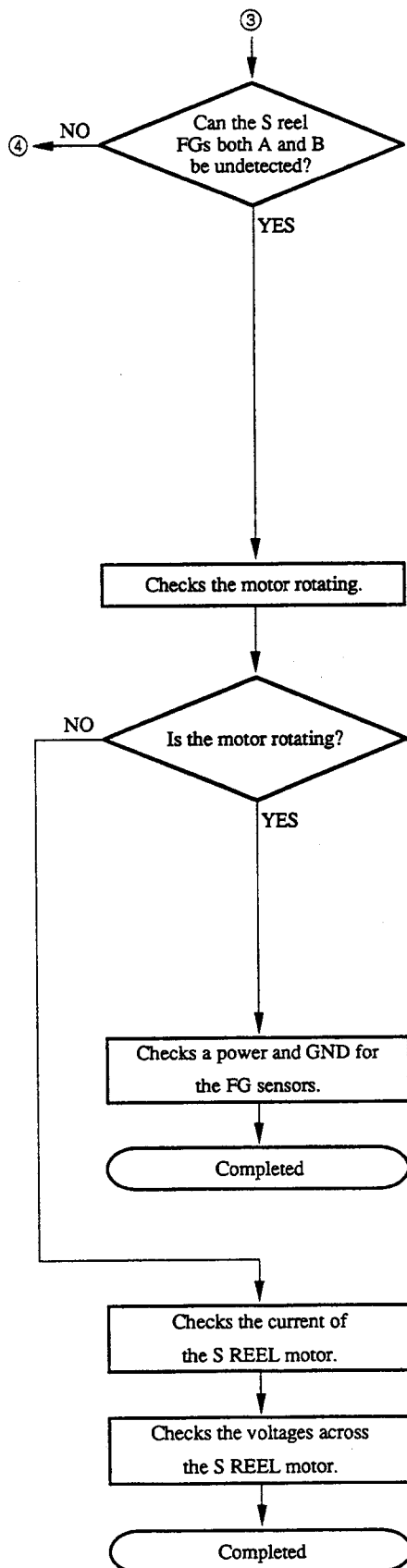
- The probable cause is that the FG sensors A and B are shorted.

Continues to the next page.

4-93 (1800/1800P/1600/1600P)  
4-91 (1400/1400P/1200/1200P)







S-REEL

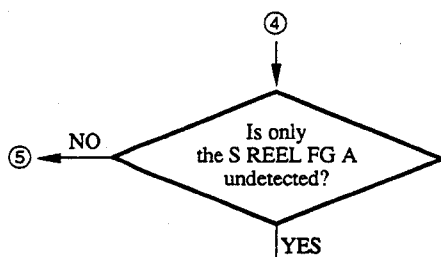
S REEL FG DUTY  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL

S-REEL  
IS THE MOTOR ROTATING?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



S-REEL

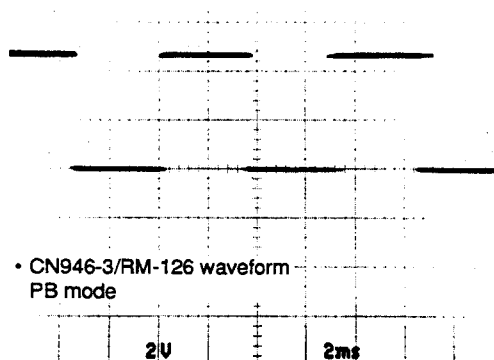
S REEL FG A  
COULD NOT BE FOUND.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL

• CN946-3/RM-126  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

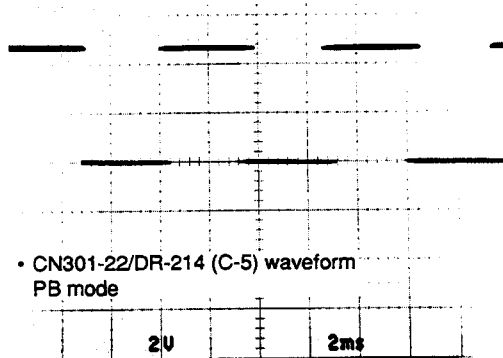


4-96 (1800/1800P/1600/1600P)  
4-94 (1400/1400P/1200/1200P)

S-REEL

- CN301-22/DR  
CHECK THE WAVE FORM  
ON THE POINT.

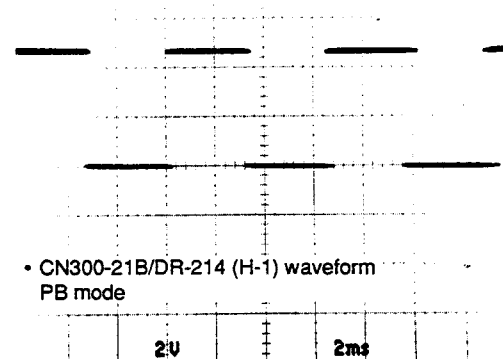
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



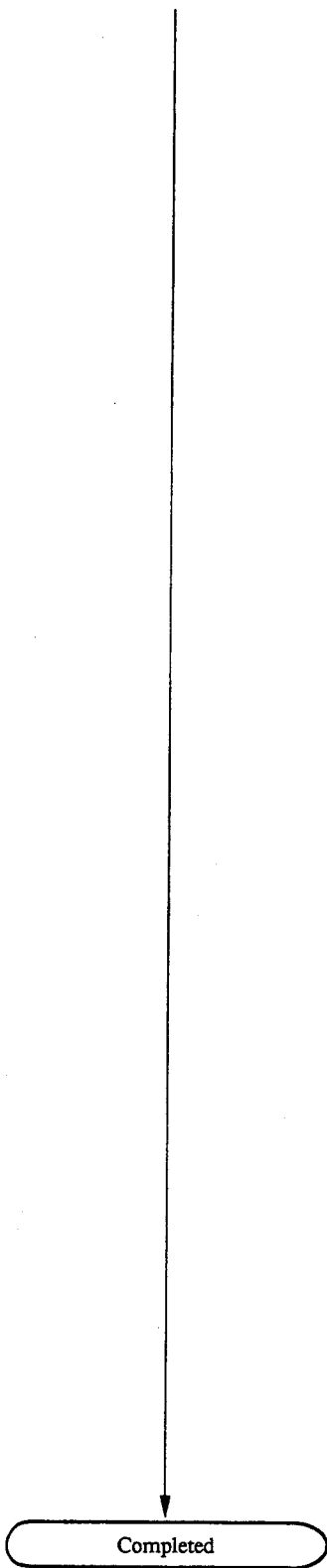
S-REEL

- CN300-21B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



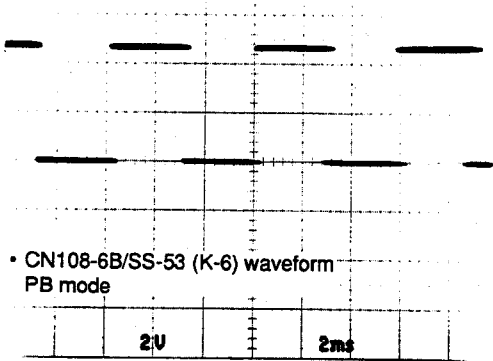
Continues to the next page.



S-REEL

- CN108-6B/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



S-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

- 1 S REEL FG SENSOR
- 2 HARNESS(SE-PM-126)
- 3 RM-126 BOARD
- 3 SE BOARD

CONTINUED...

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

- 3 MS BOARD
- 3 DR BOARD
- 3 SS BOARD
- 3 MB BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that any signal is not supplied from the FG sensor or the signal line is shorted to other signal.

⑤

Checks the waveform of  
the S REEL FG B.

S-REEL

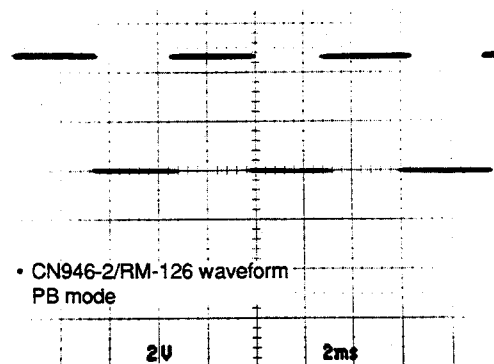
S REEL FG B  
COULD NOT BE FOUND.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL

• CN946-2/RM-126  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



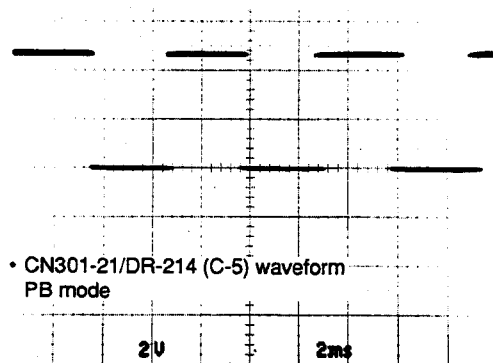
Continues to the next page.

4-99 (1800/1800P/1600/1600P)  
4-97 (1400/1400P/1200/1200P)

S-REEL

- CN301-21/DR  
CHECK THE WAVE FORM  
ON THE POINT.

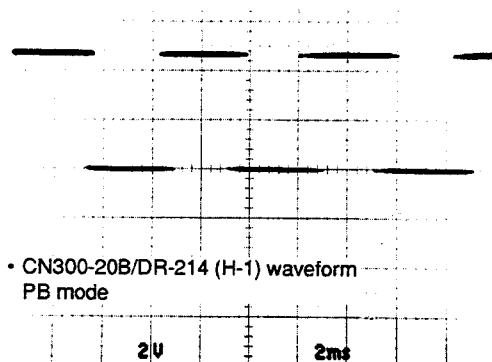
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

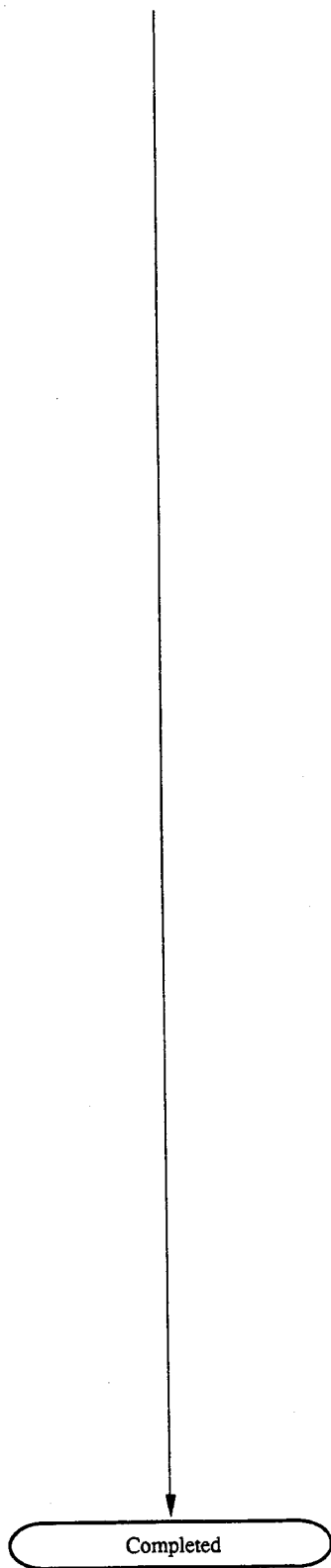


S-REEL

- CN300-20B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

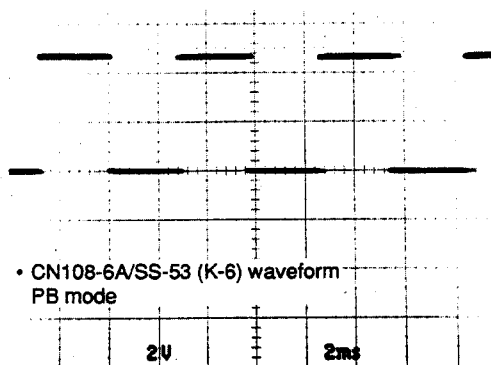




S-REEL

- CN108-6A/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



S-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

- 1 S REEL FG SENSOR
- 2 HARNESS(SE~RM-126)
- 3 RM-126 BOARD
- 3 SE BOARD

CONTINUED...

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

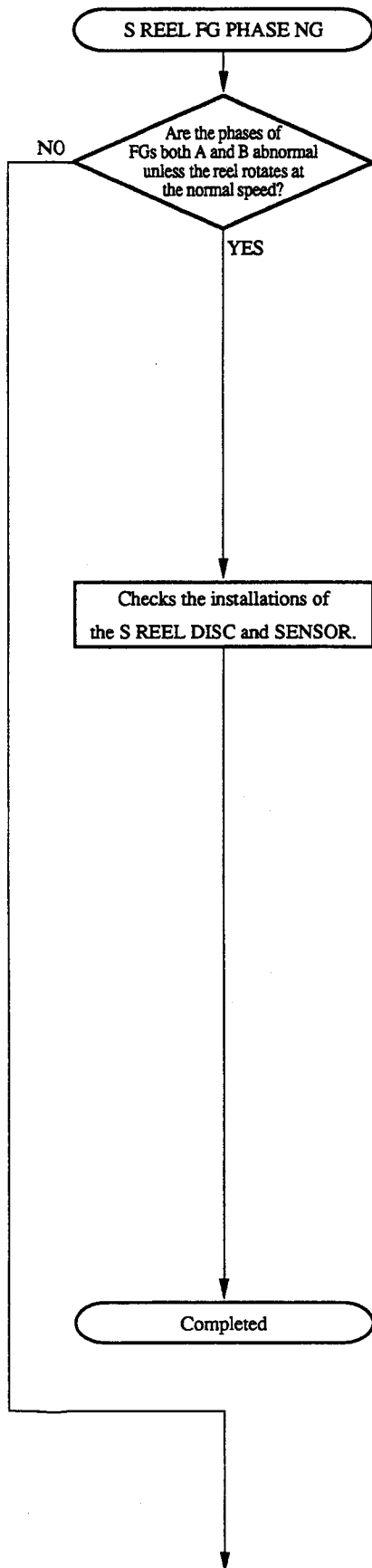
S-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

- 3 MS BOARD
- 3 DR BOARD
- 3 SS BOARD
- 3 MB BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that any signal is not supplied from the FG sensor or the signal line is shorted to other signal.



S-REEL

S REEL FG PHASE  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL

REEL DISC & SENSOR  
CHECK INSTLLATION.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Refer to section 6-7 in Service Manual Vol. 1.

S-REEL

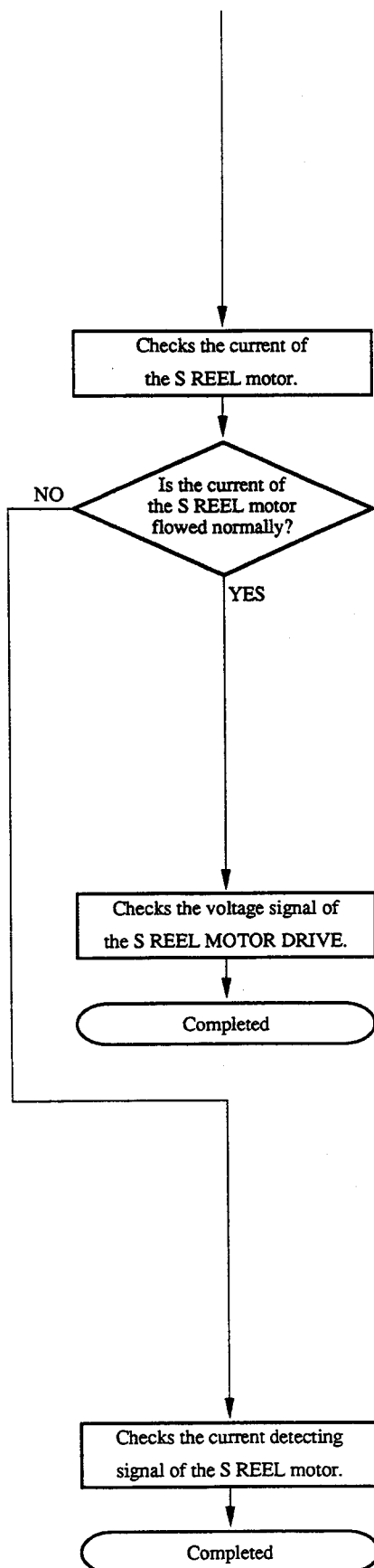
REEL DISC & SENSOR  
READJUST OR CHANGE IT.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Refer to section 6-7 in Service Manual Vol. 1.

4-102 (1800/1800P/1600/1600P)  
4-100 (1400/1400P/1200/1200P)





- The unit checks automatically.

S-REEL

S REEL SERVO  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL

S REEL MOTOR CURRENET  
CHECKES COMPLETED.

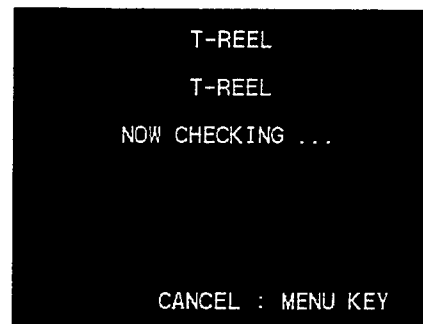
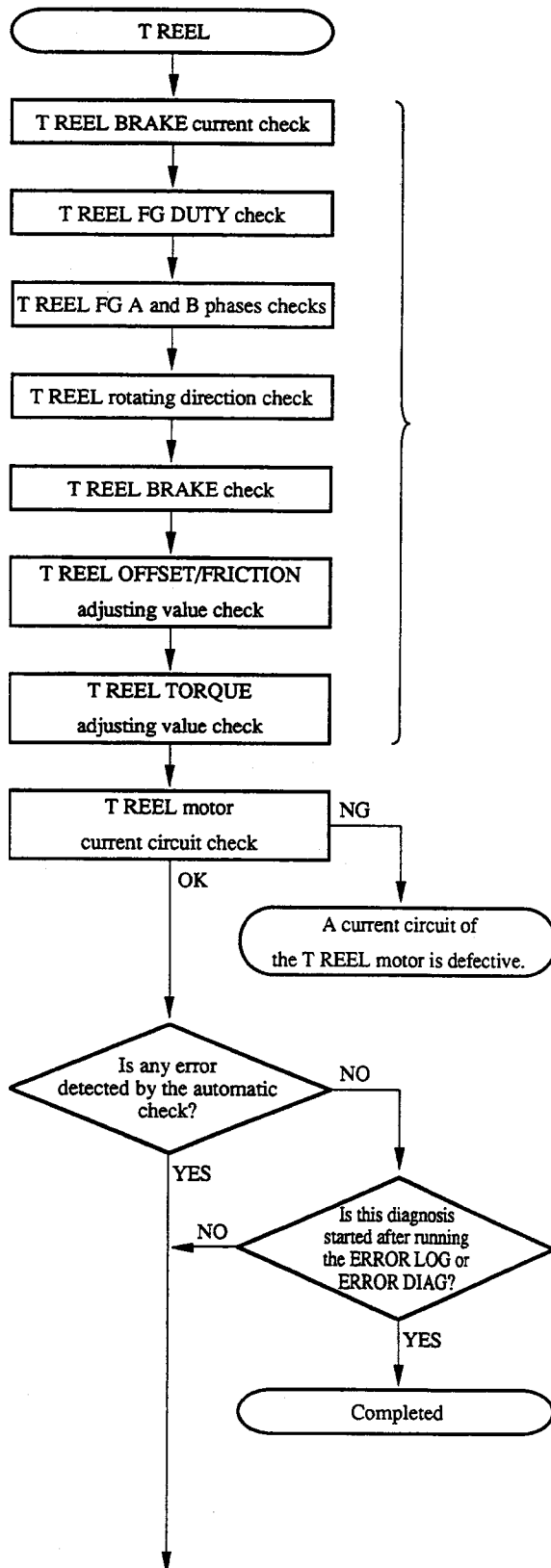
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

S-REEL

S REEL MOTOR CURRENET  
NO GOOD.

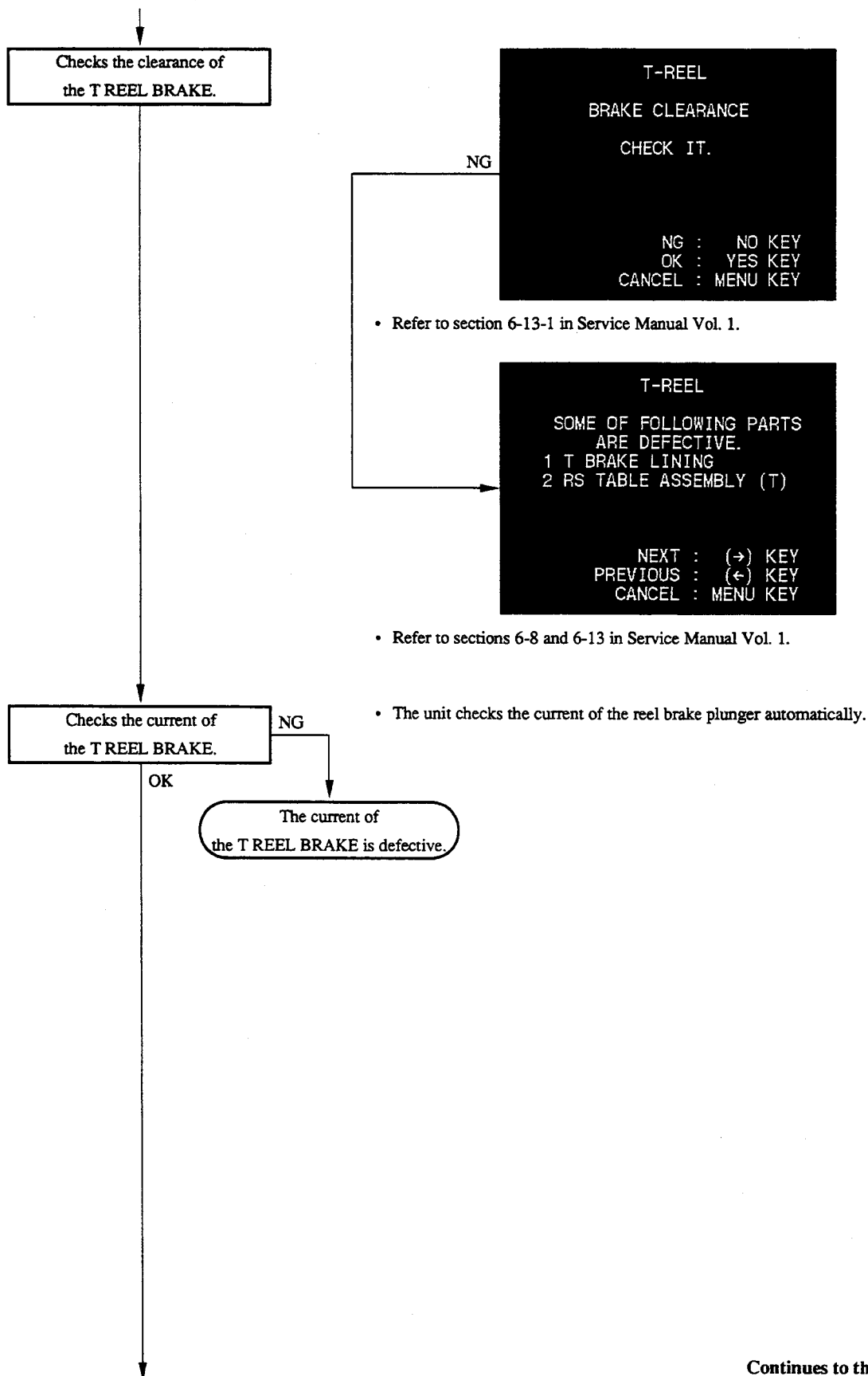
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

(8) T REEL Diagnosis

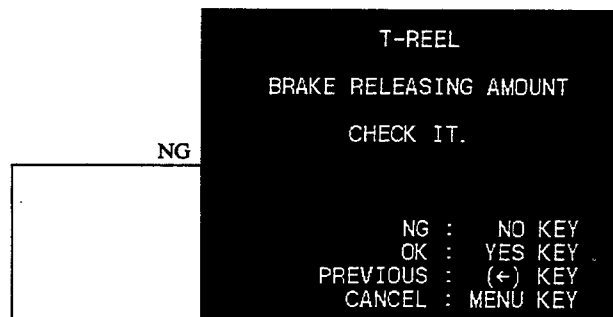
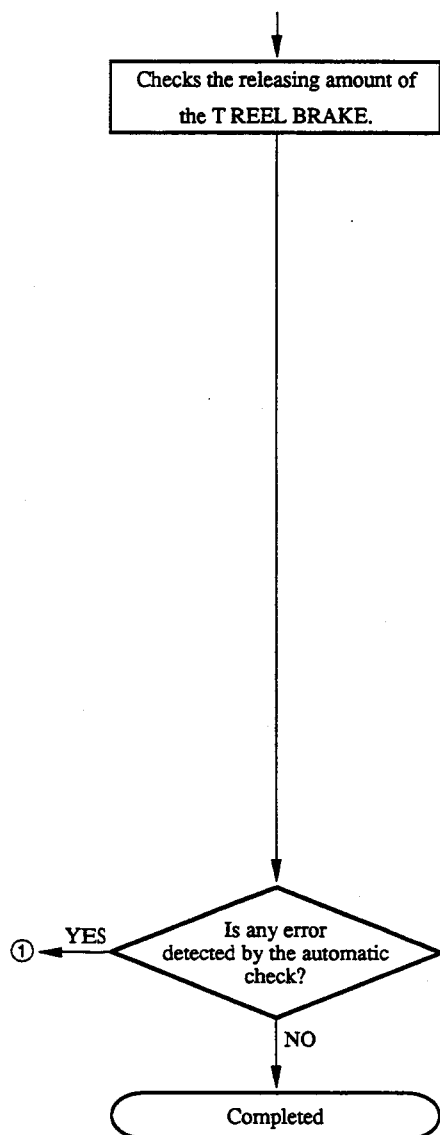


- The unit checks automatically.

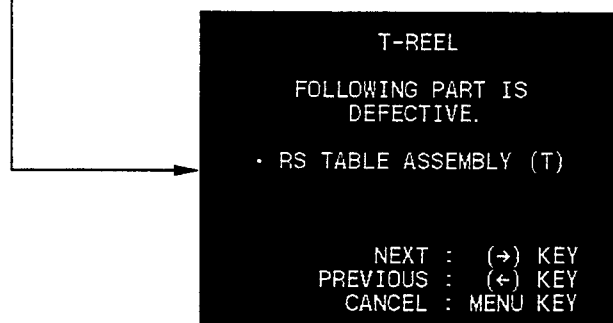
- If the automatic check is completed at this step, after running the ERROR LOG or ERROR DIAG, the check is completed. Then, the diagnosis is proceeded to the next step.



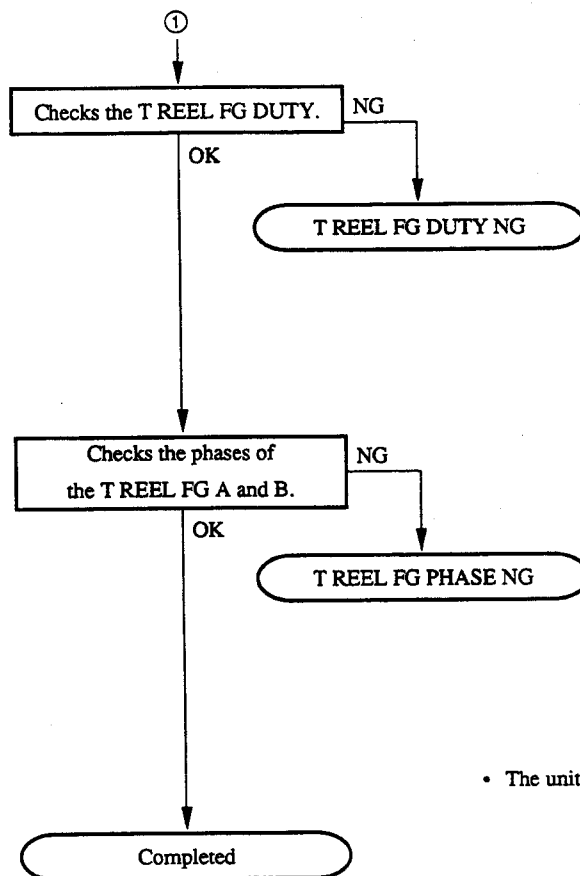
Continues to the next page.



• Refer to section 6-13-2 in Service Manual Vol. 1.



• Refer to section 6-8 in Service Manual Vol. 1.



T-REEL  
T REEL FG DUTY  
NOW CHECKING ...  
  
CANCEL : MENU KEY

T-REEL  
T REEL FG PHASE  
NOW CHECKING ...  
  
CANCEL : MENU KEY

- The unit checks automatically and searches a defective device.

A current circuit of the T REEL motor is defective.

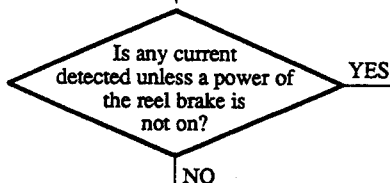
T-REEL  
T REEL MOTOR CURRENT  
NO GOOD.  
  
NEXT : (→) KEY  
CANCEL : MENU KEY

T-REEL  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 SS BOARD  
1 ADJUST +5V LINE  
  
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that an error occurs around an A/D converter for detecting the T reel current.

4-107 (1800/1800P/1600/1600P)  
4-105 (1400/1400P/1200/1200P)

The current of  
the T REEL BRAKE is defective.



T-REEL  
T REEL BRAKE CURRENT  
NO GOOD.

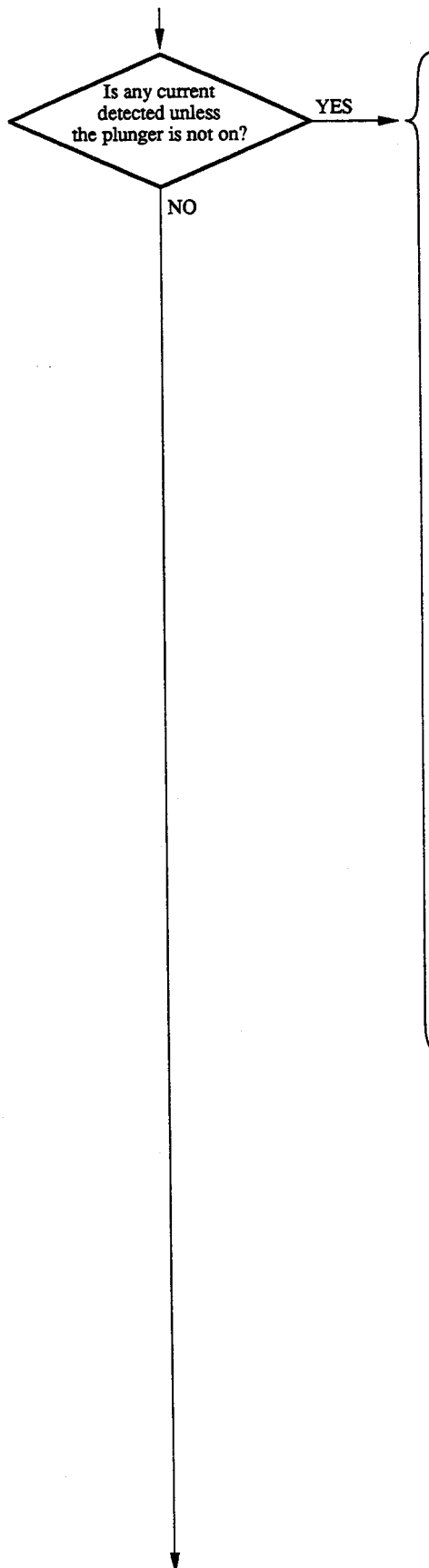
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 DR BOARD  
2 MS BOARD  
3 HARNESS (MS-DR)

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• The probable cause is that the current detecting circuit is defective.

4-108 (1800/1800P/1600/1600P)  
4-106 (1400/1400P/1200/1200P)



T-REEL

T REEL BRAKE CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 MS BOARD  
2 DR BOARD  
3 RM-127 BOARD  
3 T-REEL BRAKE PLUNGER  
CONTINUED...

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

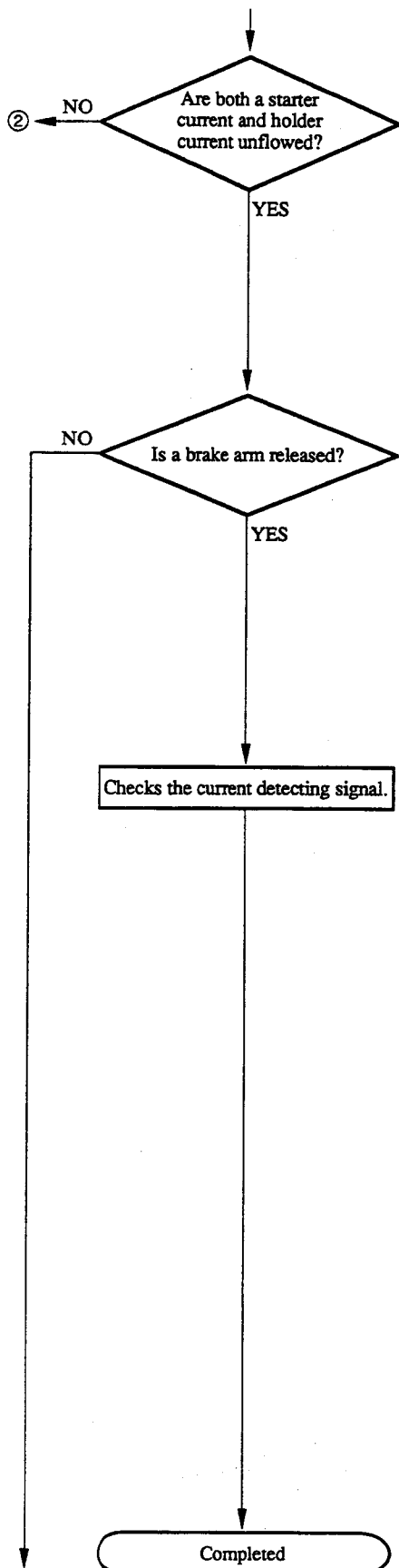
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

3 UNREG +12V LINE

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that any current is flowed by the cause such as shorting of the signal line.

Continues to the next page.



T-REEL

T REEL BRAKE CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

DOES THE REEL BRAKE  
RELEASE?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check that the reel brake is released or not.

T-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 HARNESS(MS~DR)  
2 MS BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is the faulty connections of connectors or a break in the signal line on the SS board.

T-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

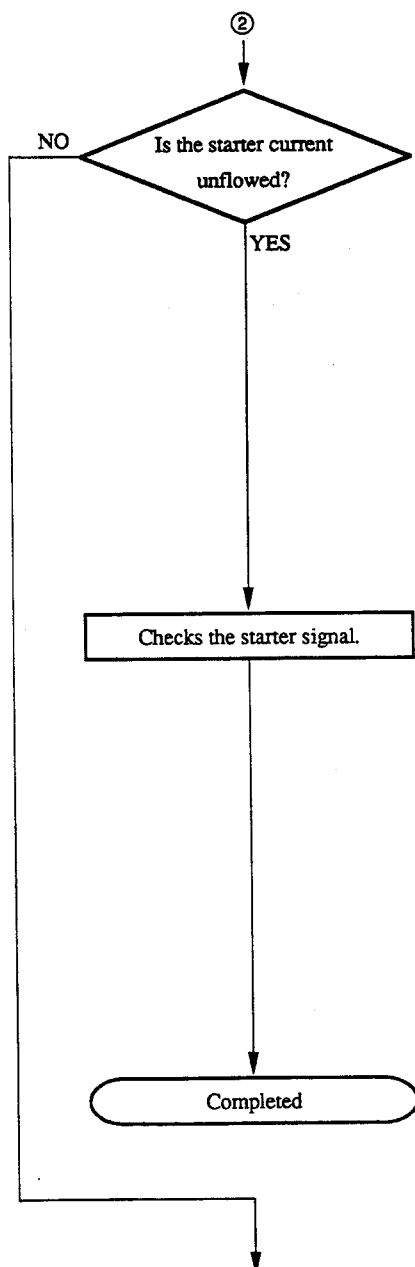
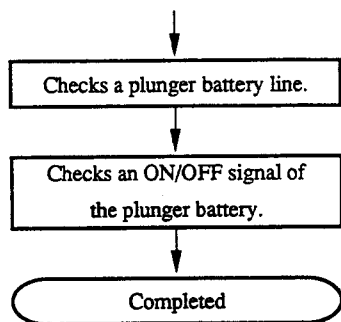
1 DR BOARD  
2 MS BOARD  
3 HARNESS(MS~DR)

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that the current detecting circuit on the DR board is defective or a SOL. CURRENT signal is shorted on the MB or DR board.

4-110 (1800/1800P/1600/1600P)  
4-108 (1400/1400P/1200/1200P)





T-REEL

T BRAKE STARTER CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

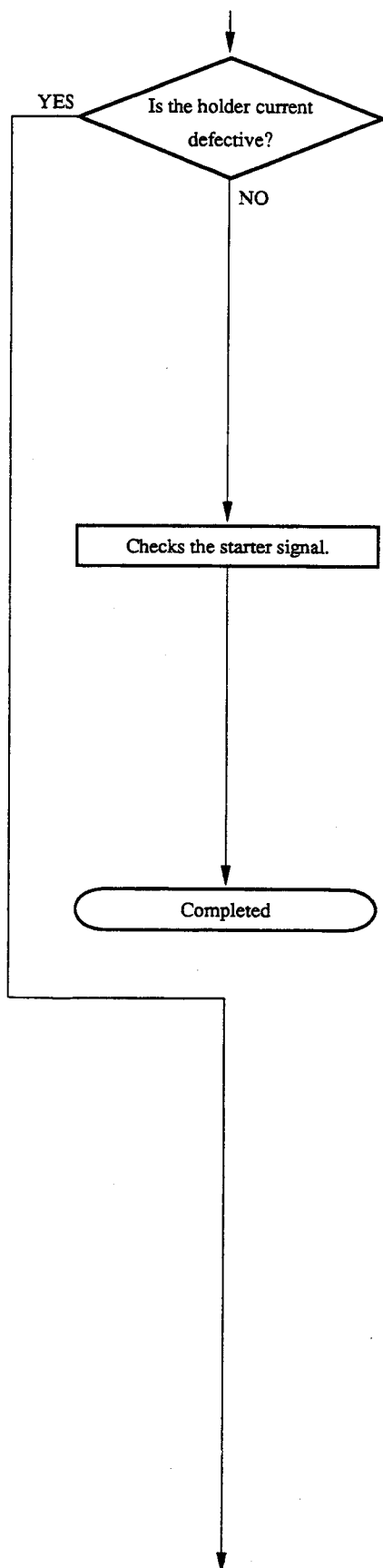
• CN954-2/RM-127  
IS LOW PULSE DETECTED  
WHILE PRESSING (↑)KEY?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check that about 300 msec pulse is occurred every a second, while pressing the (↑) key.
- Check that the voltage is more than 10 V, while not pressing the (↑) key.

Continues to the next page.

4-111 (1800/1800P/1600/1600P)  
4-109 (1400/1400P/1200/1200P)



T-REEL

T BRAKE HOLDER CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

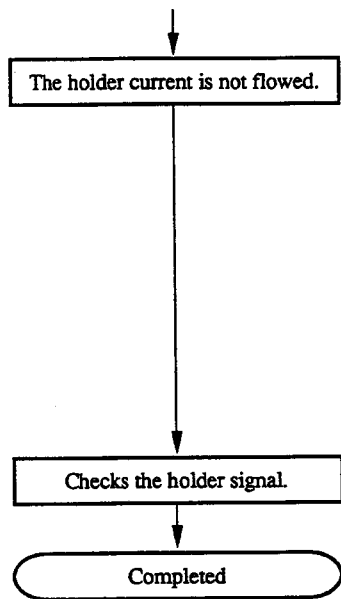
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 MS BOARD  
2 RM-127 BOARD  
3 T-REEL BRAKE PLUNGER

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The starter continues operating.

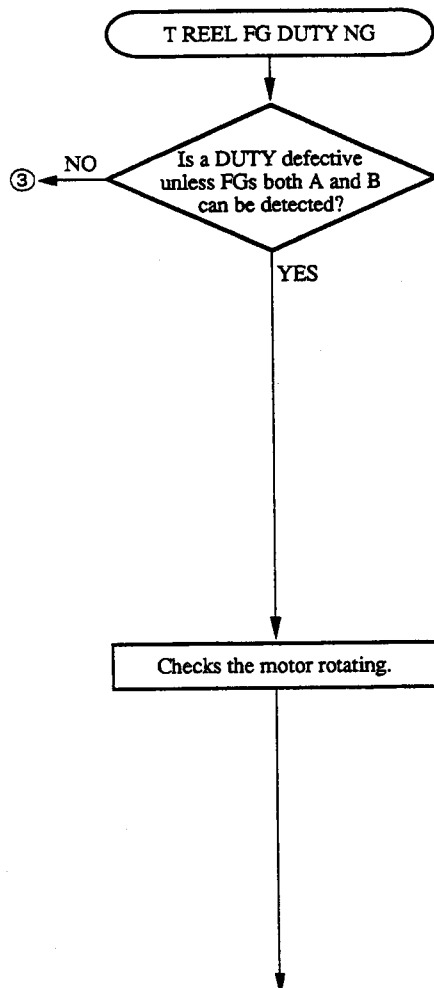
4-112 (1800/1800P/1600/1600P)  
4-110 (1400/1400P/1200/1200P)



T-REEL

T BRAKE HOLDER CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

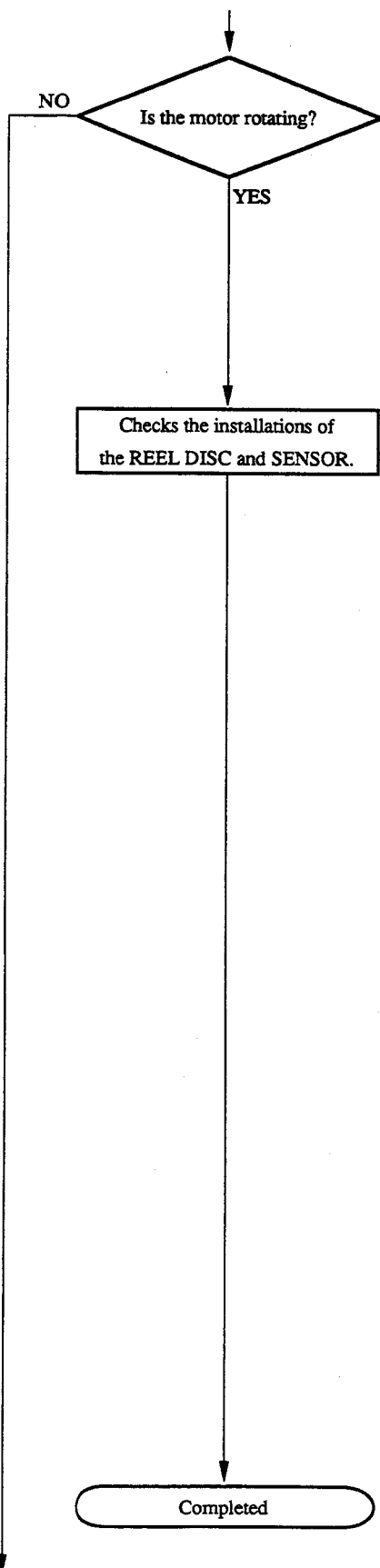


T-REEL

T REEL FG DUTY  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

Continues to the next page.



T-REEL

T-REEL  
IS THE MOTOR ROTATING?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

REEL DISC & SENSOR  
CHECK INSTLLATION.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Refer to section 6-7 in Service Manual Vol. 1.

T-REEL

REEL DISC & SENSOR  
READJUST OR CHANGE IT.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Refer to section 6-7 in Service Manual Vol. 1.

T-REEL

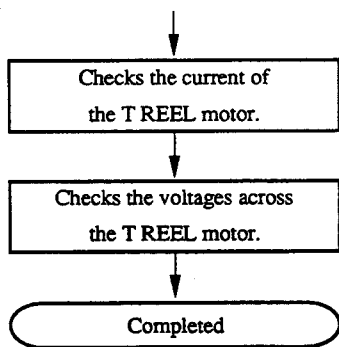
FOLLOWING PART IS  
DEFECTIVE.

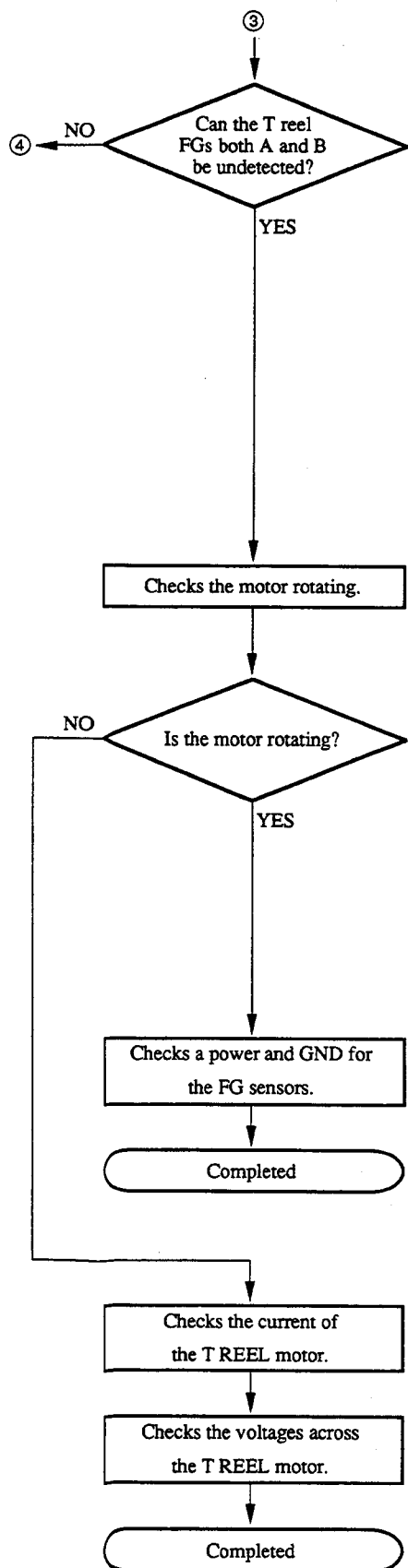
• T REEL FG SENSOR

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that the FG sensors A and B are shorted.

4-114 (1800/1800P/1600/1600P)  
4-112 (1400/1400P/1200/1200P)





T-REEL

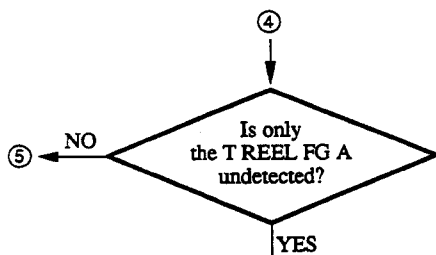
T REEL FG  
COULD NOT BE FOUND.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

T-REEL  
IS THE MOTOR ROTATING?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



T-REEL

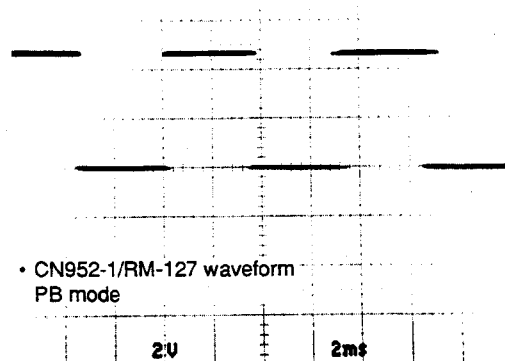
T REEL FG A  
COULD NOT BE FOUND.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

• CN952-1/RM-127  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



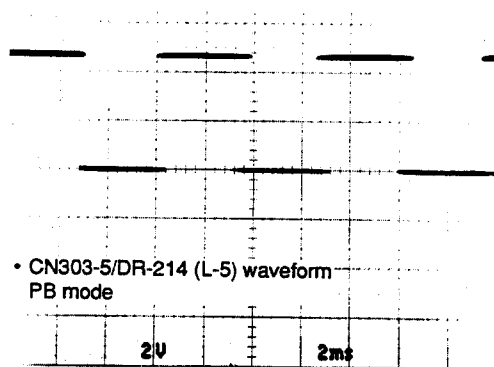
Continues to the next page.

4-117 (1800/1800P/1600/1600P)  
4-115 (1400/1400P/1200/1200P)

T-REEL

- CN303-5/DR  
CHECK THE WAVE FORM  
ON THE POINT.

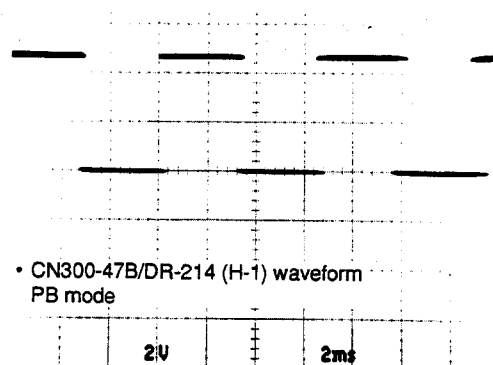
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



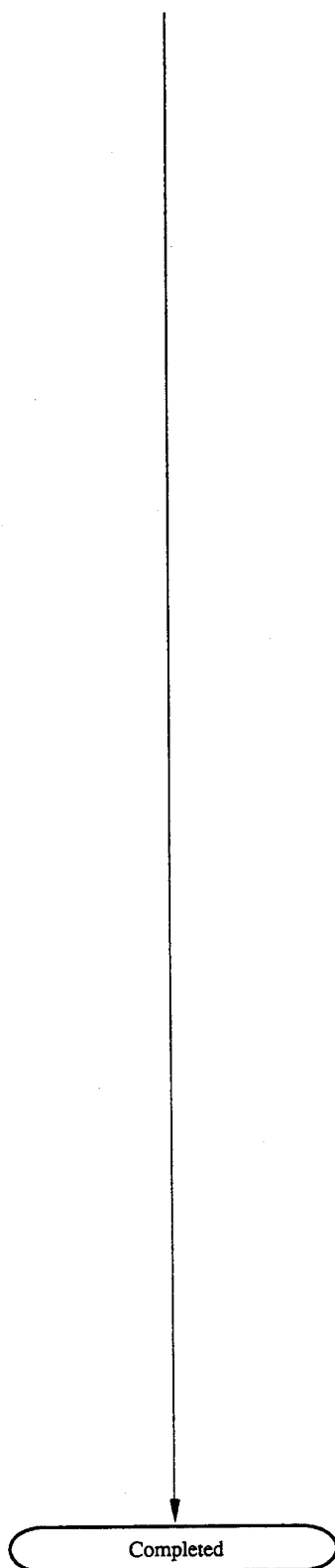
T-REEL

- CN300-47B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



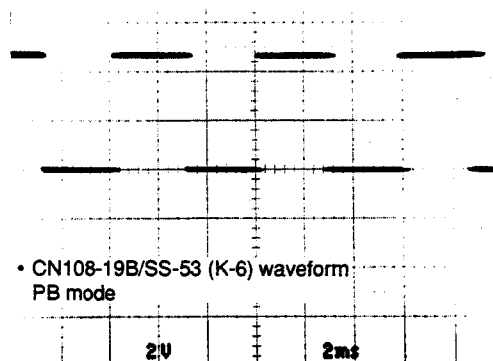




T-REEL

- CN108-19B/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



T-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

- 1 T REEL FG SENSOR
- 2 HARNESS(SE-RM-127)
- 3 RM-127 BOARD
- 3 SE BOARD

CONTINUED...

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

- 3 MS BOARD
- 3 DR BOARD
- 3 SS BOARD
- 3 MB BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that any signal is not supplied from the FG sensor or the signal line is shorted to other signal.

⑤

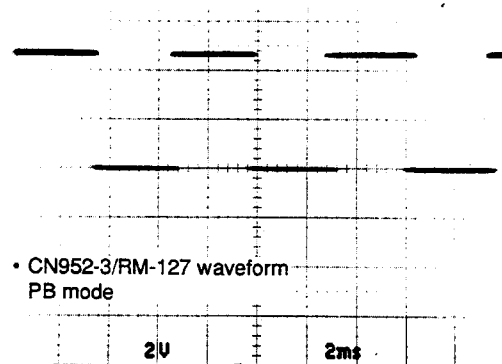
Checks the waveform of  
the T REEL FG B.

T-REEL  
T REEL FG B  
COULD NOT BE FOUND.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL  
• CN952-3/RM-127  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

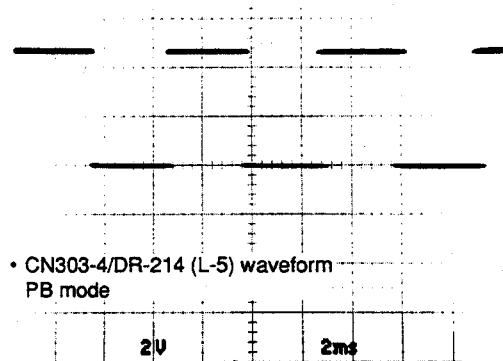


4-120 (1800/1800P/1600/1600P)  
4-118 (1400/1400P/1200/1200P)

T-REEL

- CN303-4/DR  
CHECK THE WAVE FORM  
ON THE POINT.

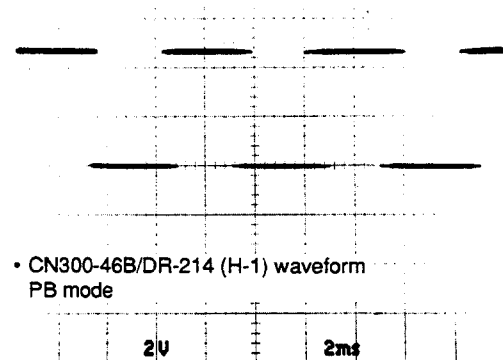
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



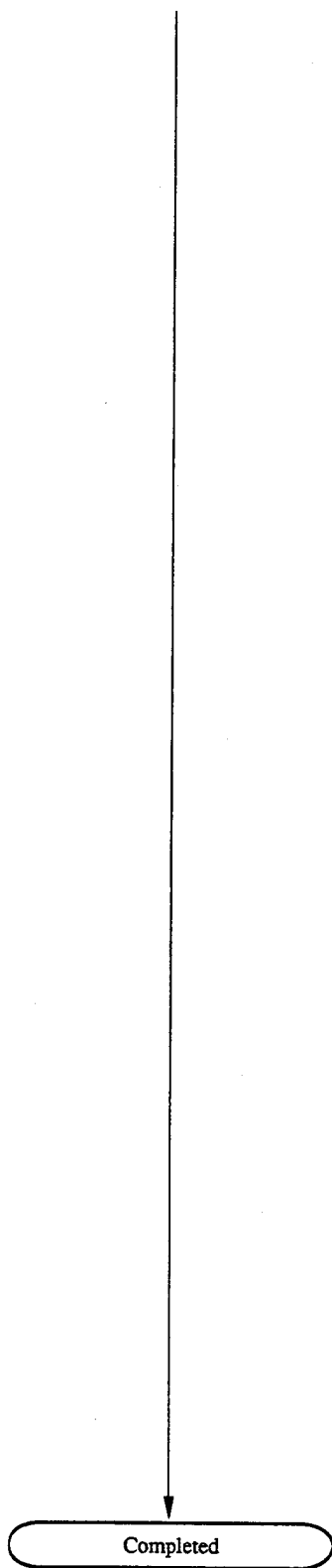
T-REEL

- CN300-46B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



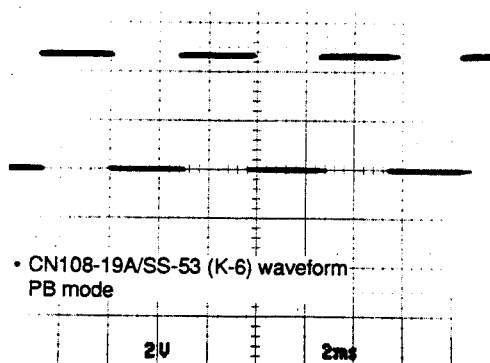
Continues to the next page.



T-REEL

- CN108-19A/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



T-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

- 1 T REEL FG SENSOR
- 2 HARNESS(SE-RM-127)
- 3 RM-127 BOARD
- 3 SE BOARD

CONTINUED...

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

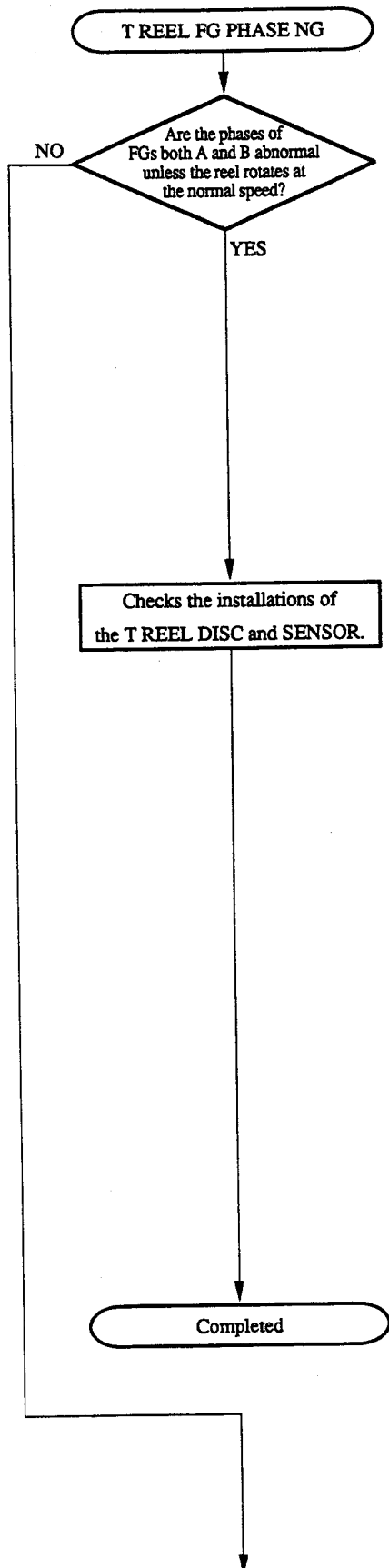
T-REEL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

- 3 MS BOARD
- 3 DR BOARD
- 3 SS BOARD
- 3 MB BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that any signal is not supplied from the FG sensor or the signal line is shorted to other signal.



T-REEL

T REEL FG PHASE  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

REEL DISC & SENSOR  
CHECK INSTLLATION.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

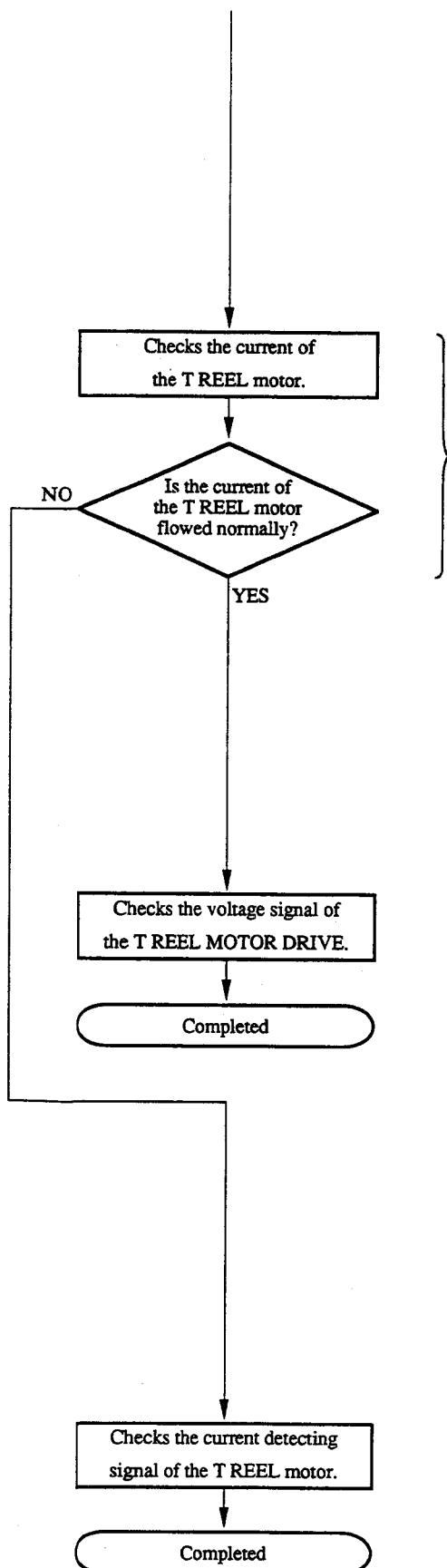
- Refer to section 6-7 in Service Manual Vol. 1.

T-REEL

REEL DISC & SENSOR  
READJUST OR CHANGE IT.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Refer to section 6-7 in Service Manual Vol. 1.



- The unit checks automatically.

T-REEL

T REEL SERVO  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

T-REEL

T REEL MOTOR CURRENET  
CHECKES COMPLETED.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

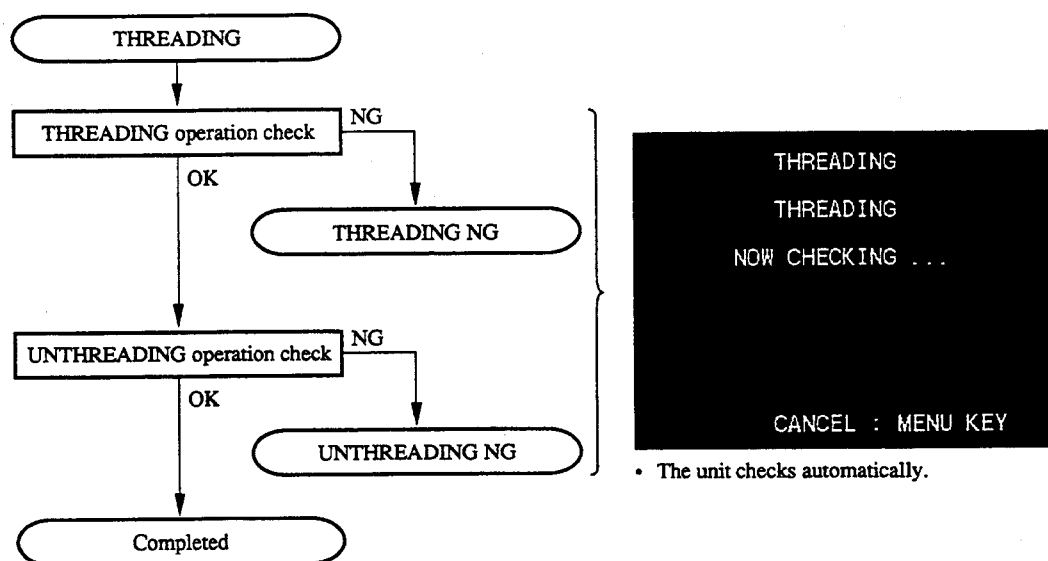
T-REEL

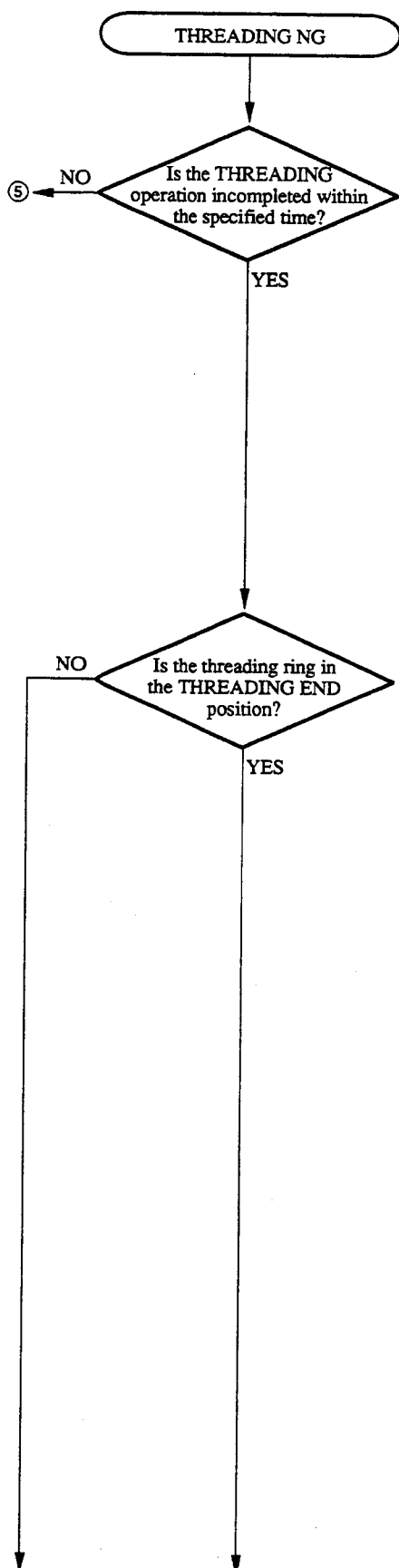
T REEL MOTOR CURRENET  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

4-124 (1800/1800P/1600/1600P)  
4-122 (1400/1400P/1200/1200P)

(9) THREADING Diagnosis





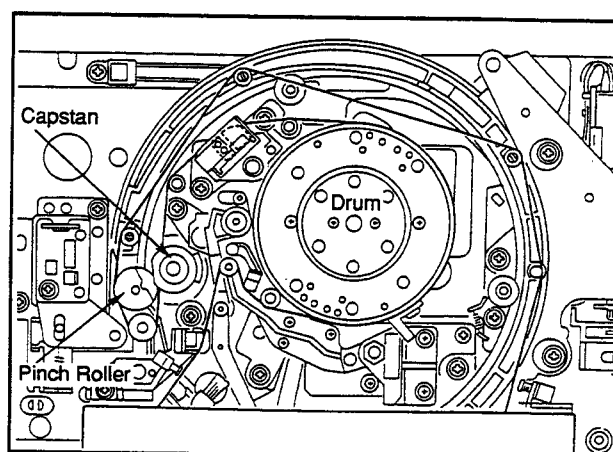
THREADING  
THREADING  
TIME OVER.

NEXT : (→) KEY  
CANCEL : MENU KEY

THREADING  
IS THE THREADING RING  
AT THE THREADING END  
POSITION?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

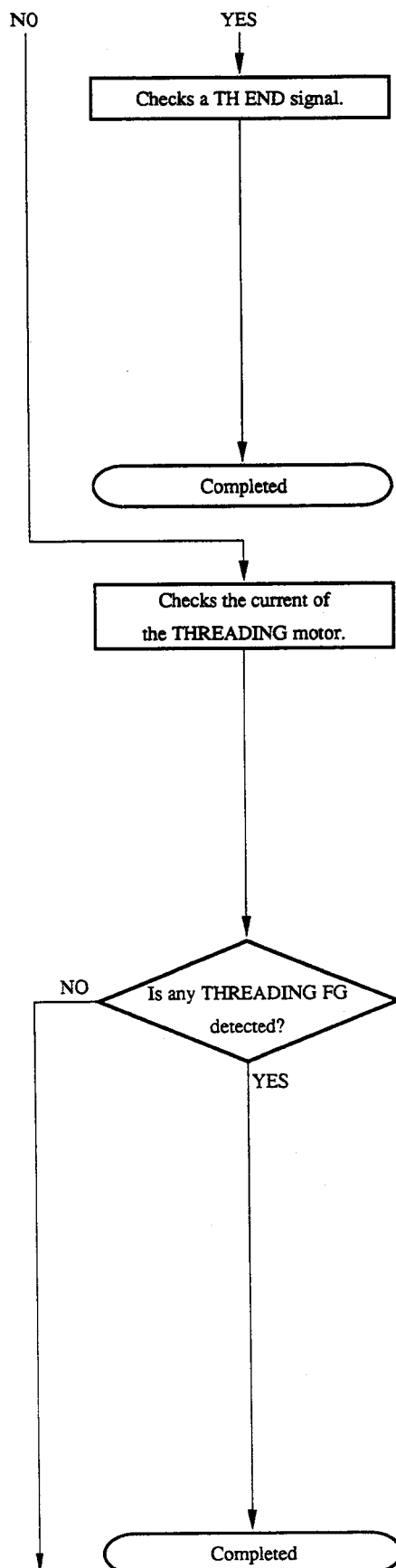
- Check the position of the threading ring.



Check : The pinch roller should be against the capstan motor.

4-126 (1800/1800P/1600/1600P)  
4-124 (1400/1400P/1200/1200P)





THREADING

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 TH./UNTH. END SENSOR  
2 PTC-68 BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The other cause than the above is that the voltage does not become more than 4 V because the TH END signal is shorted to other signal.

THREADING

THREADING MOTOR CURRENT

NOW CHECKING ...

CANCEL : MENU KEY

- The unit checks automatically.

THREADING

TH. MOTOR WAS ROTATED.

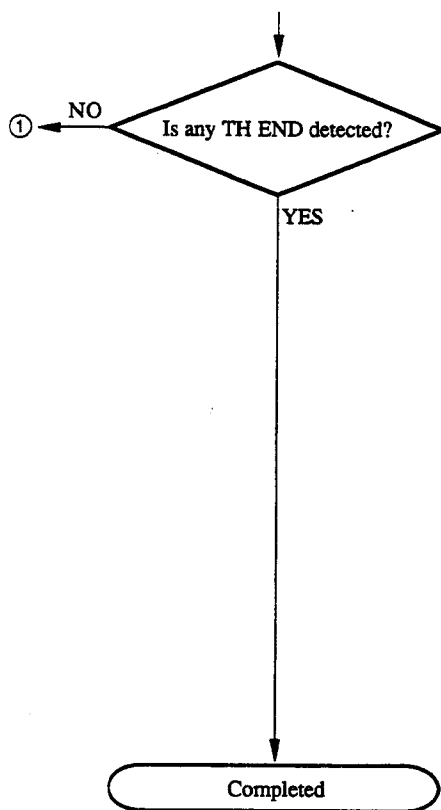
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

THREADING

THREADING GEAR BOX  
EXCHANGE AGAIN AND  
READJUST IT.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

Continues to the next page.



THREADING

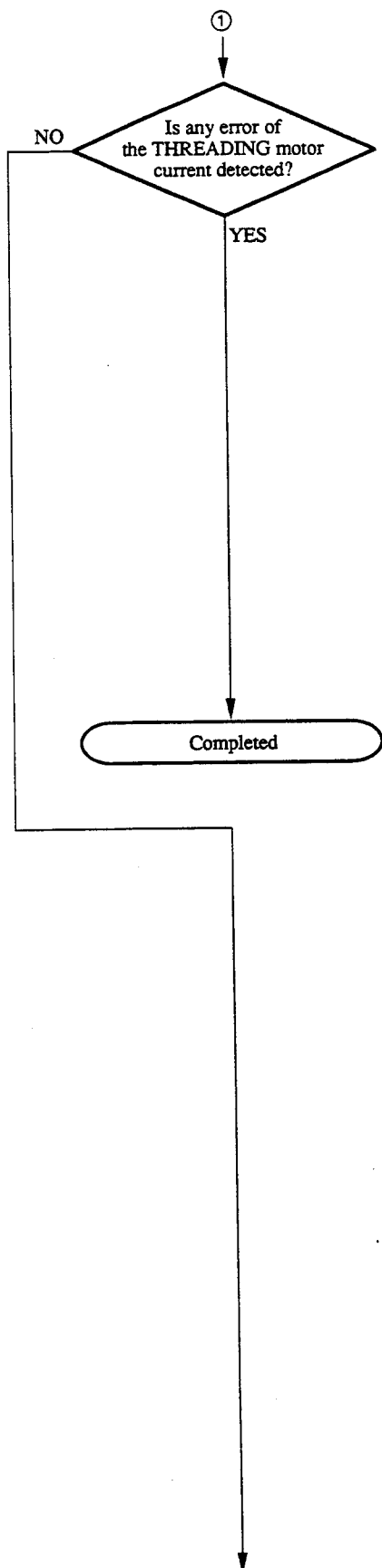
TH. END WAS DETECTED.

NEXT : (→) KEY  
 PREVIOUS : (←) KEY  
 CANCEL : MENU KEY

THREADING

THREADING GEAR BOX  
 EXCHANGE AGAIN AND  
 READJUST IT.

NEXT : (→) KEY  
 PREVIOUS : (←) KEY  
 CANCEL : MENU KEY



THREADING

THREADING MOTOR CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

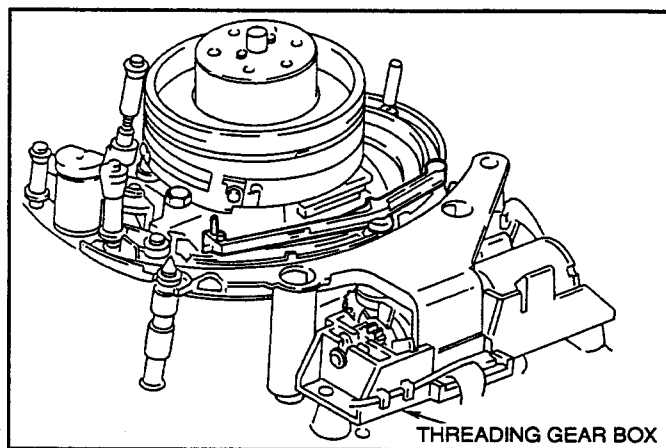
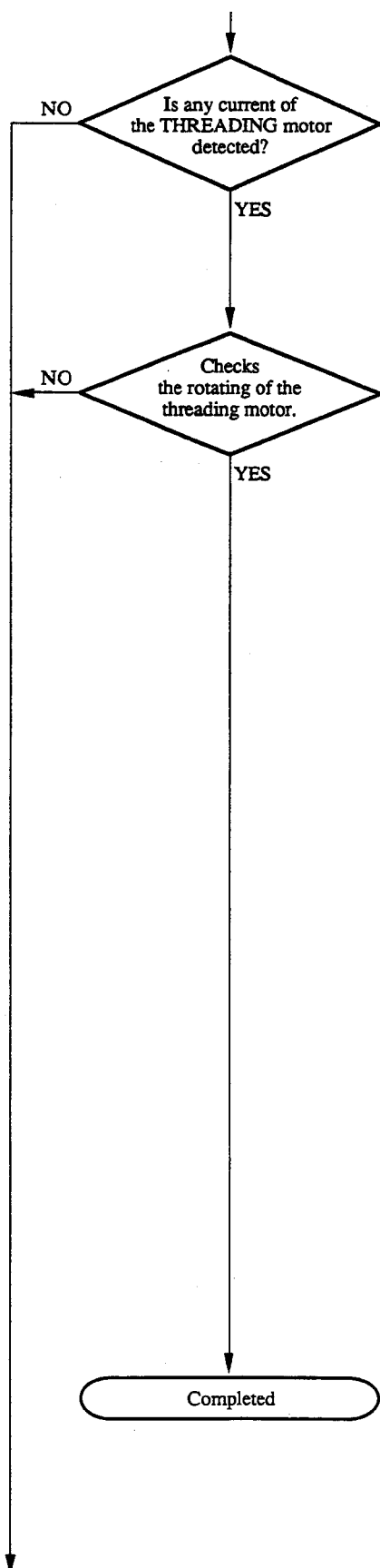
THREADING

THREADING  
<MECHANICAL TROUBLE>  
ROTATE A WARM GEAR AND  
CHECK THE ACTIVATION.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

Continues to the next page.

4-129 (1800/1800P/1600/1600P)  
4-127 (1400/1400P/1200/1200P)



```

THREADING
DOES THE MOTOR ROTATE
WHILE PRESS (↑)/(↓)KEYS?

THREADING : (↑) KEY
UNTHREADING : (↓) KEY
NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- Check that the threading motor is rotating free or not.

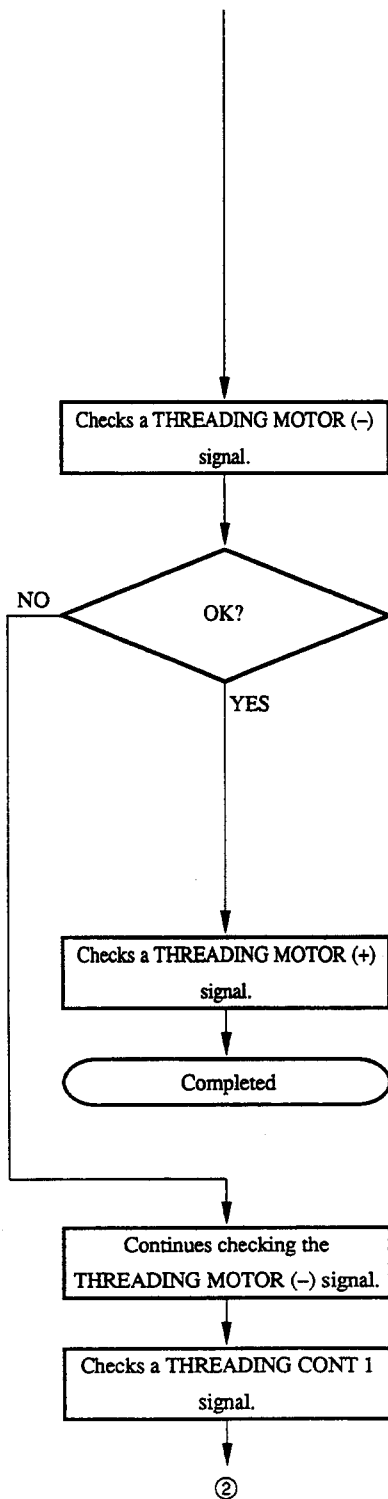
```

THREADING
FOLLOWING PART IS
DEFECTIVE.

• THREADING GEAR BOX

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- The threading motor is rotating free.



THREADING

THREADING MOTOR CURRENT  
COULD NOT BE FOUND.

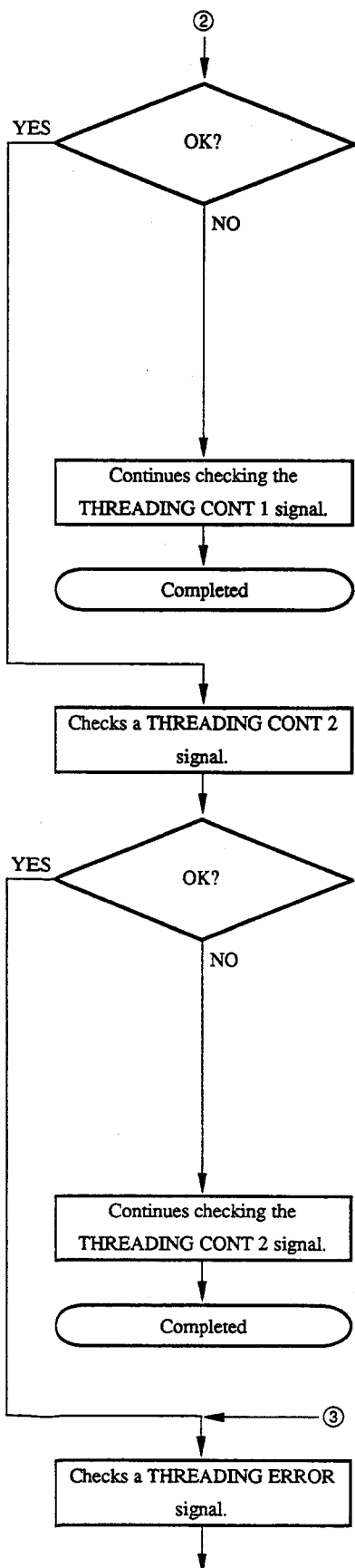
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

THREADING

• CN941-2/PTC-67  
IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

A > 4 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



THREADING

• IC151-1/DR  
IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

A < 1 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC151/DR-214 (L-4)

THREADING

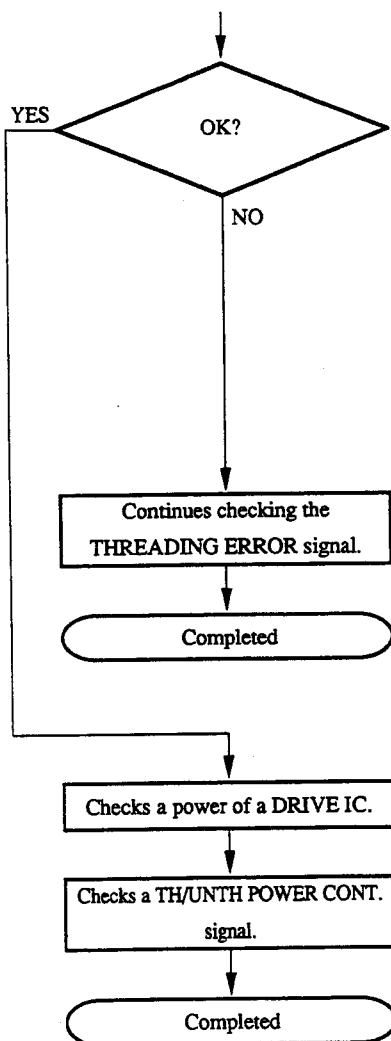
• IC151-2/DR  
IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

A > 4 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC151/DR-214 (L-4)

4-132 (1800/1800P/1600/1600P)  
4-130 (1400/1400P/1200/1200P)



THREADING

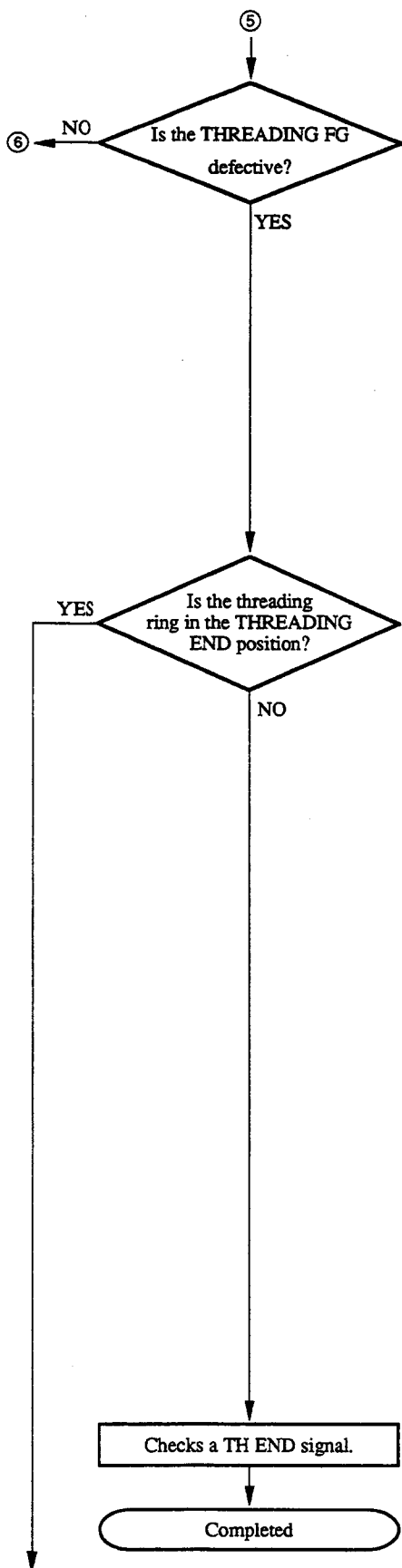
- IC151-6/DR

IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

A > 4 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC151/DR-214 (L-4)



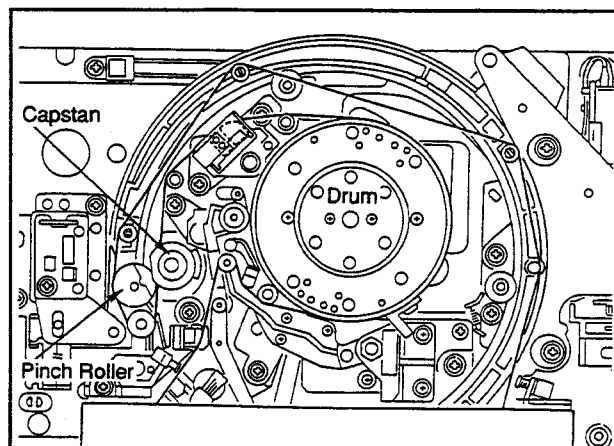
THREADING  
 THREADING FG  
 NO GOOD.

NEXT : (→) KEY  
 CANCEL : MENU KEY

THREADING  
 IS THE THREADING RING  
 AT THE THREADING END  
 POSITION?

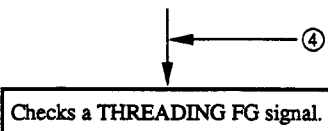
NO : NO KEY  
 YES : YES KEY  
 PREVIOUS : (←) KEY  
 CANCEL : MENU KEY

- Check the position of the threading ring.



Check : The pinch roller should be against the capstan motor.





```

THREADING
IS THE FG DETECTED WHILE
PRESS (↑)/(↓)KEYS?
TH FG NO EXIST

THREADING : (↑) KEY
UNTHREADING : (↓) KEY
NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

```

- If this display is not changed after pressing the (↑) or (↓) key, press the NO key.

```

THREADING
IS THE FG DETECTED WHILE
PRESS (↑)/(↓)KEYS?
TH FG EXIST

THREADING : (↑) KEY
UNTHREADING : (↓) KEY
NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

```

- If this display is not changed after pressing the (↑) or (↓) key, press the YES key.

```

THREADING
• CN108-15A/SS
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

```

A1 1.2 V



- CN108-15A/SS-53 (K-6) waveform

2V

1ms

Continues to the next page.

4-135 (1800/1800P/1600/1600P)  
4-133 (1400/1400P/1200/1200P)

# THREADING

- CN300-38B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

A1 1.2 V



- CN300-38B/DR-214 (H-1) waveform

2 V

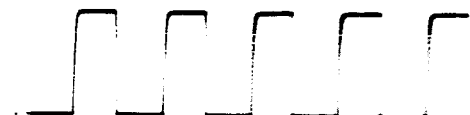
1ms

# THREADING

- CN302-20/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

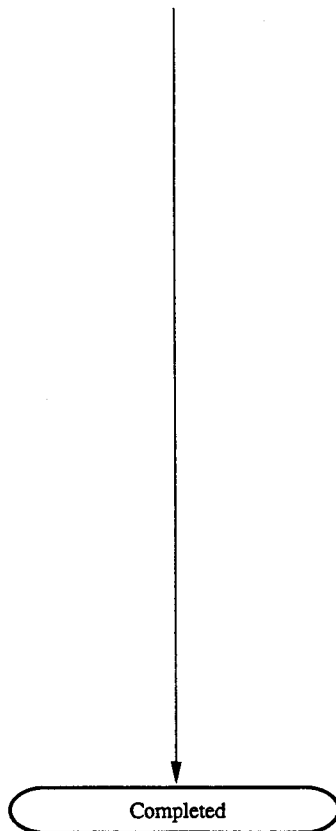
A1 1.2 V



- CN302-20/DR-214 (H-5) waveform

2 V

1ms



THREADING

- CN941-4/PTC-67

CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

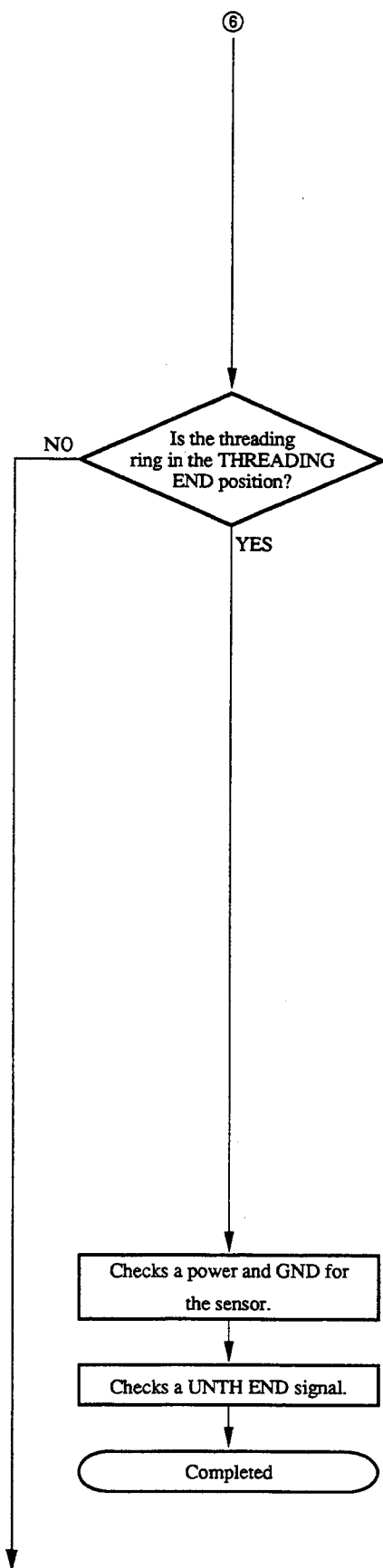
A1 1.2 V



• CN941-4/PTC-67 waveform

2V

1ms



THREADING

TH. /UNTH. END SENSOR  
NO GOOD.

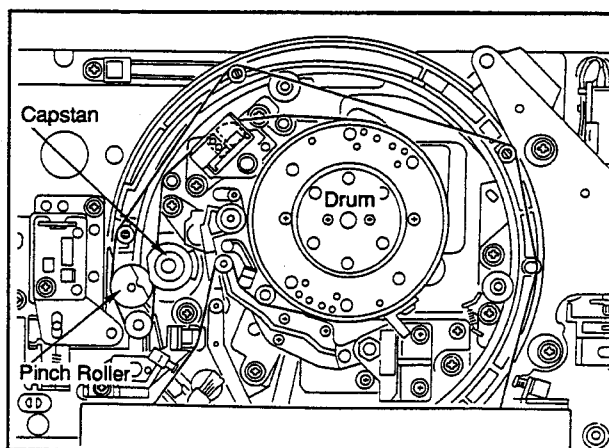
NEXT : (→) KEY  
CANCEL : MENU KEY

THREADING

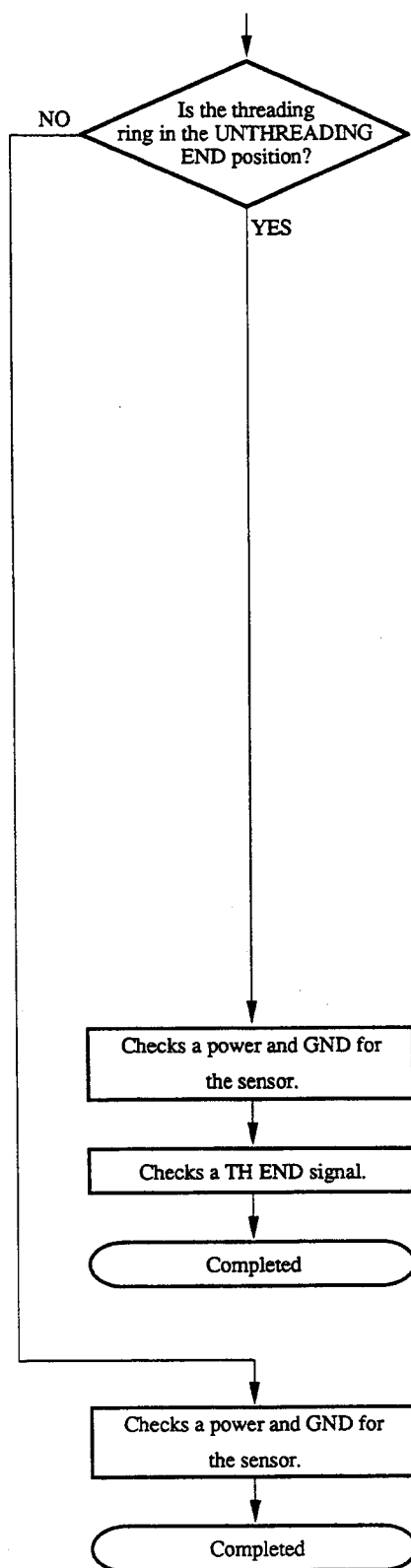
IS THE THREADING RING  
AT THE THREADING END  
POSITION?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check the position of the threading ring.



Check : The pinch roller should be against the capstan motor.

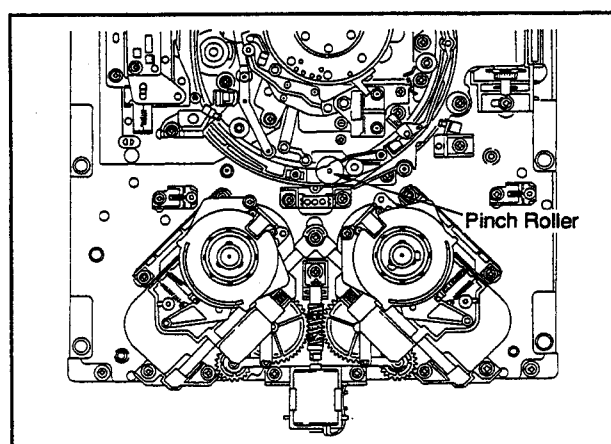


THREADING

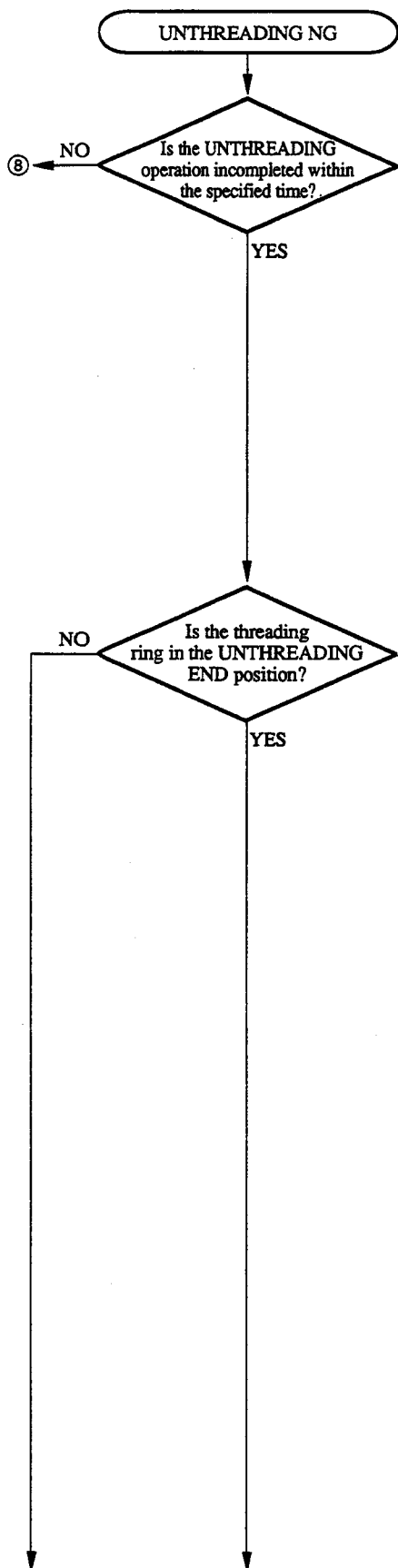
IS THE THREADING RING AT THE UNTHREADING END POSITION?

NO : NO KEY  
 YES : YES KEY  
 PREVIOUS : (←) KEY  
 CANCEL : MENU KEY

- Check the position of the threading ring.



Check : The pinch roller should be in the position as shown in the figure.



THREADING  
UNTHREADING  
TIME OVER.

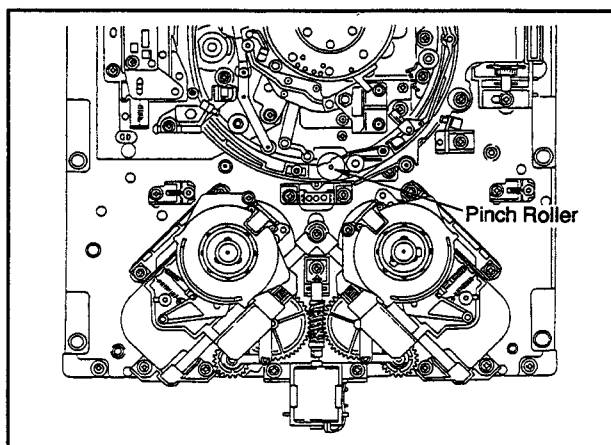
NEXT : (→) KEY  
CANCEL : MENU KEY

THREADING

IS THE THREADING RING  
AT THE UNTHREADING END  
POSITION?

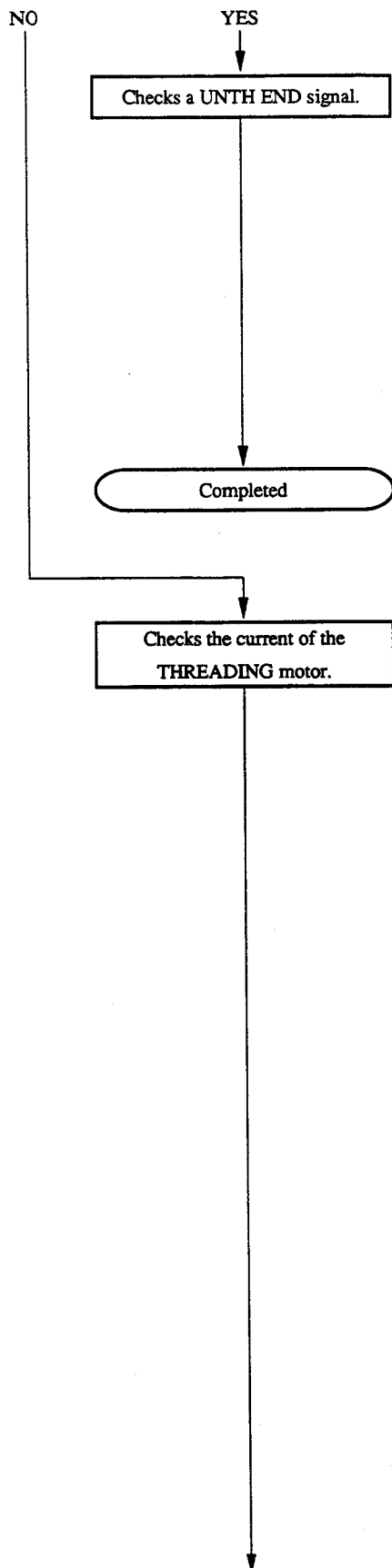
NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check the position of the threading ring.



Check : The pinch roller should be in the position as shown in the figure.

4-140 (1800/1800P/1600/1600P)  
4-138 (1400/1400P/1200/1200P)



THREADING

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 TH./UNTH. END SENSOR  
2 PTC-68 BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The other cause than the above is that the voltage does not become more than 4 V because the UNTH END signal is shorted to other signal.

THREADING

THREADING MOTOR CURRENT

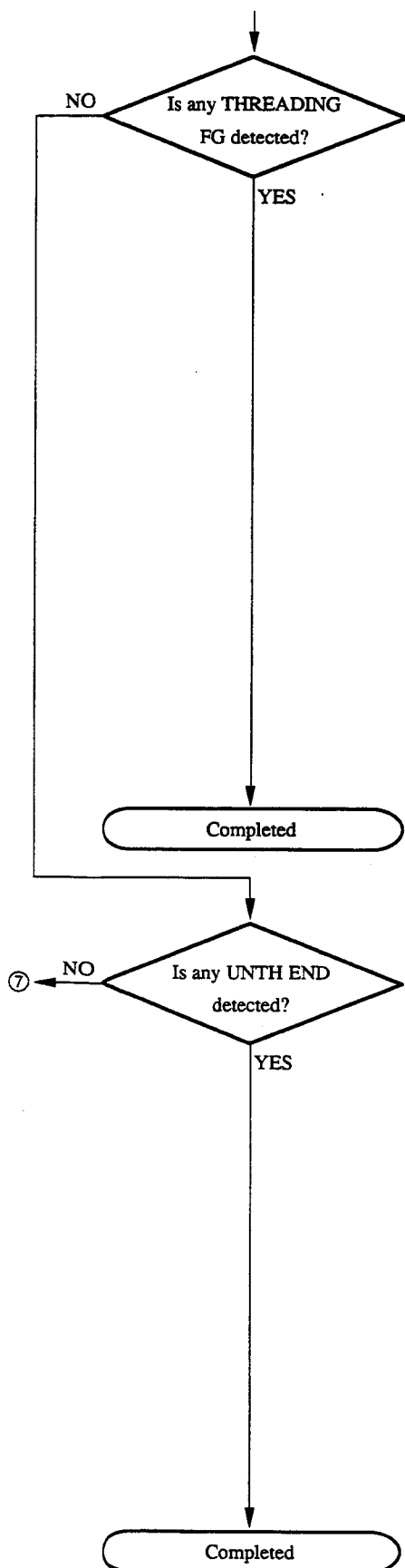
NOW CHECKING ...

CANCEL : MENU KEY

- The unit checks automatically.

Continues to the next page.

4-141 (1800/1800P/1600/1600P)  
4-139 (1400/1400P/1200/1200P)



THREADING

TH. MOTOR WAS ROTATED.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

THREADING

THREADING GEAR BOX  
EXCHANGE AGAIN AND  
READJUST IT.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

THREADING

UNTH. END WAS DETECTED.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

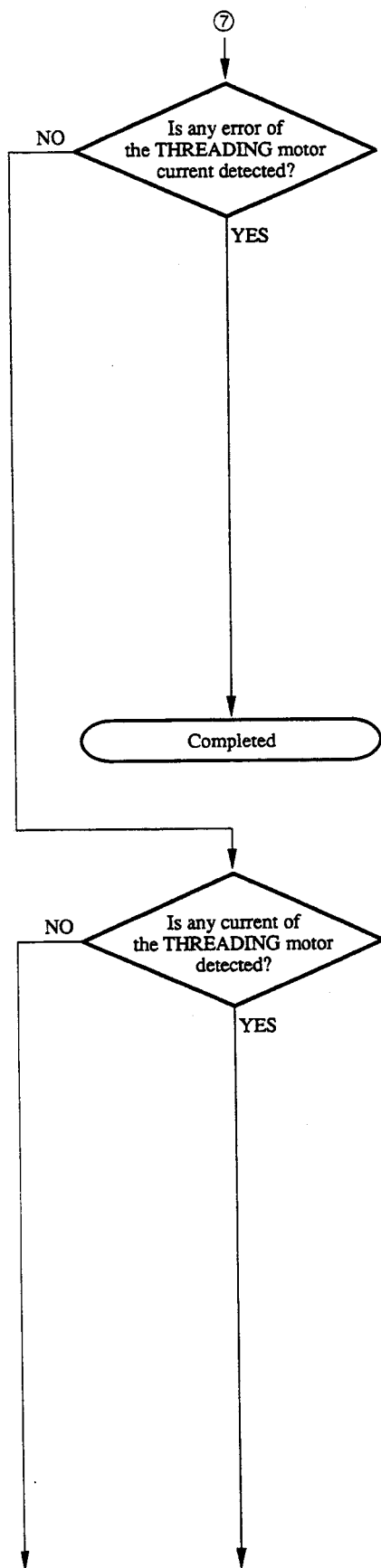
THREADING

THREADING GEAR BOX  
EXCHANGE AGAIN AND  
READJUST IT.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

4-142 (1800/1800P/1600/1600P)  
4-140 (1400/1400P/1200/1200P)





THREADING

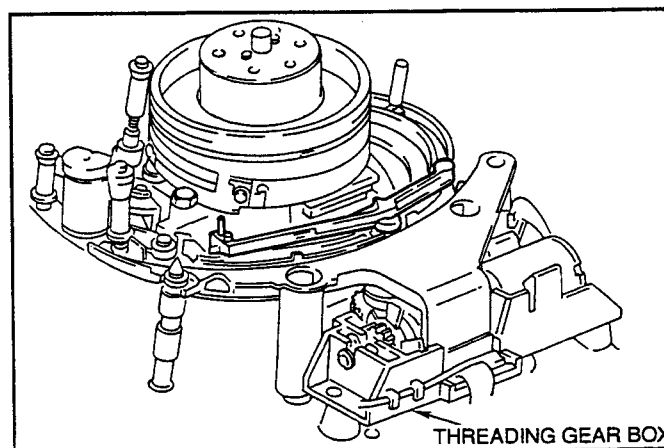
THREADING MOTOR CURRENT  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

THREADING

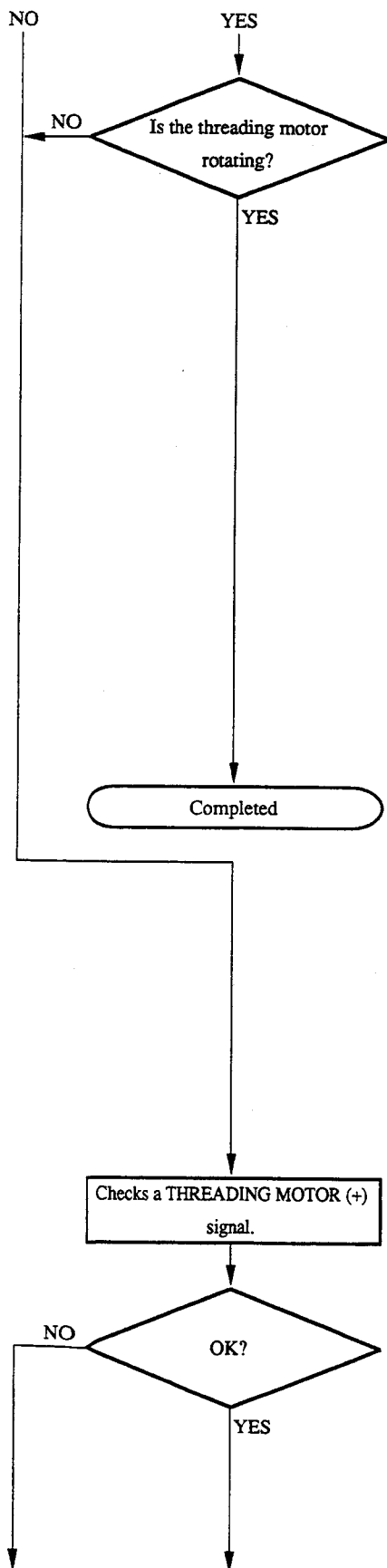
THREADING  
<MECHANICAL TROUBLE>  
ROTATE A WARM GEAR AND  
CHECK THE ACTIVATION.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



Continues to the next page.

4-143 (1800/1800P/1600/1600P)  
4-141 (1400/1400P/1200/1200P)



4-144 (1800/1800P/1600/1600P)  
 4-142 (1400/1400P/1200/1200P)

THREADING  
 DOES THE MOTOR ROTATE  
 WHILE PRESS (↑)/(↓)KEYS?

THREADING : (↑) KEY  
 UNTHREADING : (↓) KEY  
 NO : NO KEY  
 YES : YES KEY  
 PREVIOUS : (←) KEY  
 CANCEL : MENU KEY

- Check that the threading motor is rotating free or not.

THREADING  
 FOLLOWING PART IS  
 DEFECTIVE.

• THREADING GEAR BOX

NEXT : (→) KEY  
 PREVIOUS : (←) KEY  
 CANCEL : MENU KEY

- The threading motor is rotating free.

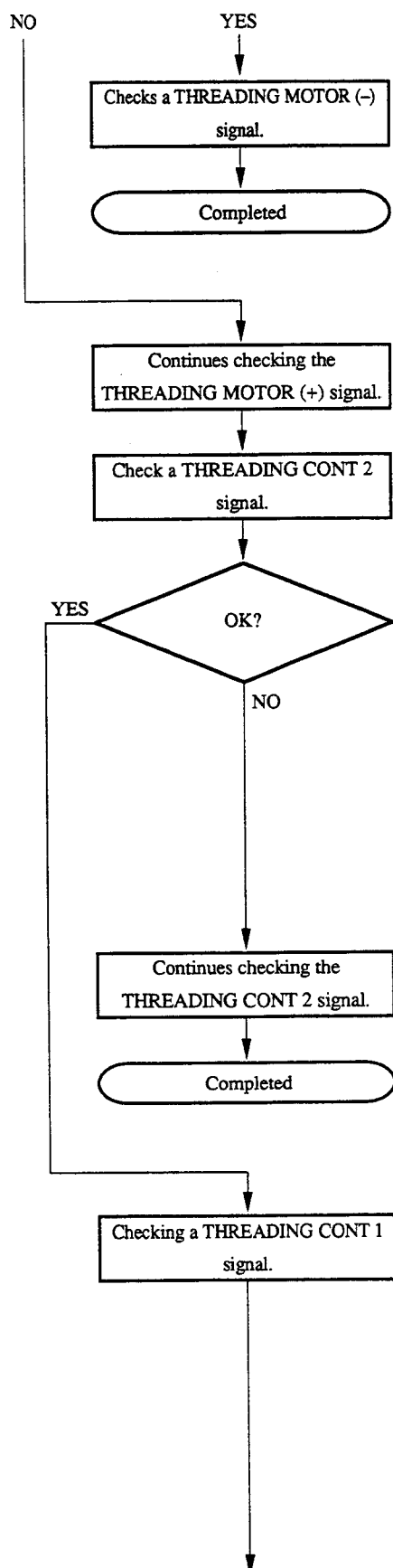
THREADING  
 THREADING MOTOR CURRENT  
 COULD NOT BE FOUND.

NEXT : (→) KEY  
 PREVIOUS : (←) KEY  
 CANCEL : MENU KEY

THREADING  
 • CN941-1/PTC-67  
 IS THE VOLTAGE VALUE <A>  
 PERMISSIBLE LIMIT?

A > 4 V

NO : NO KEY  
 YES : YES KEY  
 PREVIOUS : (←) KEY  
 CANCEL : MENU KEY



THREADING

• IC151-2/DR  
IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

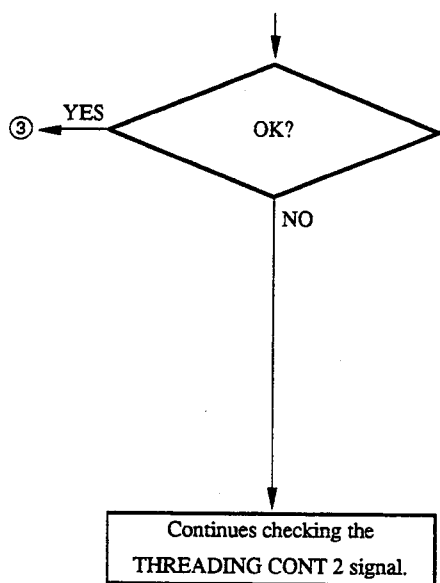
A < 1 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC151/DR-214 (L-4)

Continues to the next page.

4-145 (1800/1800P/1600/1600P)  
4-143 (1400/1400P/1200/1200P)



```

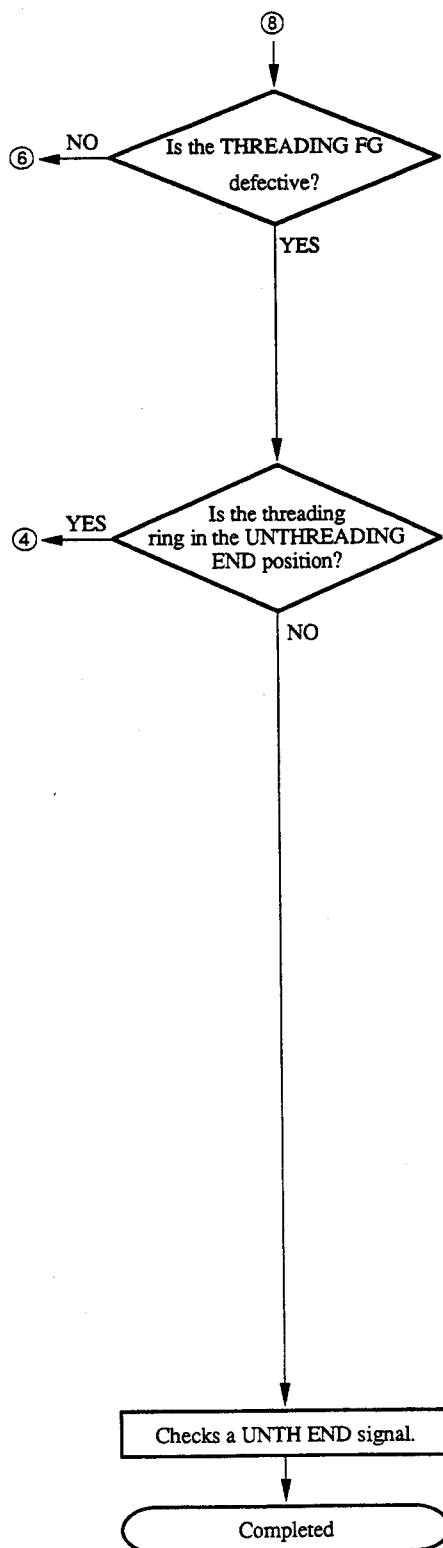
THREADING

• IC151-1/DR
IS THE VOLTAGE VALUE <A>
PERMISSIBLE LIMIT?

A > 4 V

NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

• IC151/DR-214 (L-4)



THREADING

THREADING FG  
NO GOOD.

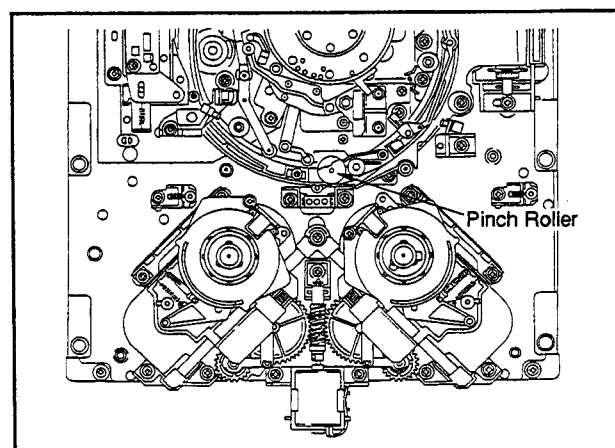
NEXT : (→) KEY  
CANCEL : MENU KEY

THREADING

IS THE THREADING RING  
AT THE UNTHREADING END  
POSITION?

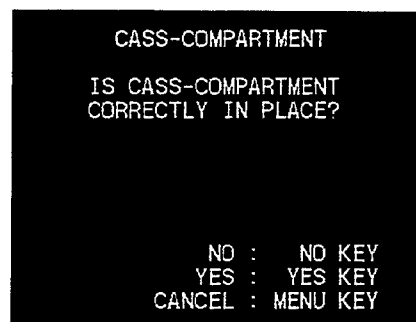
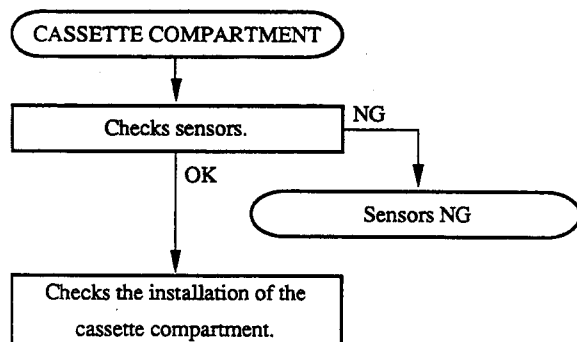
NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check the position of the threading ring.

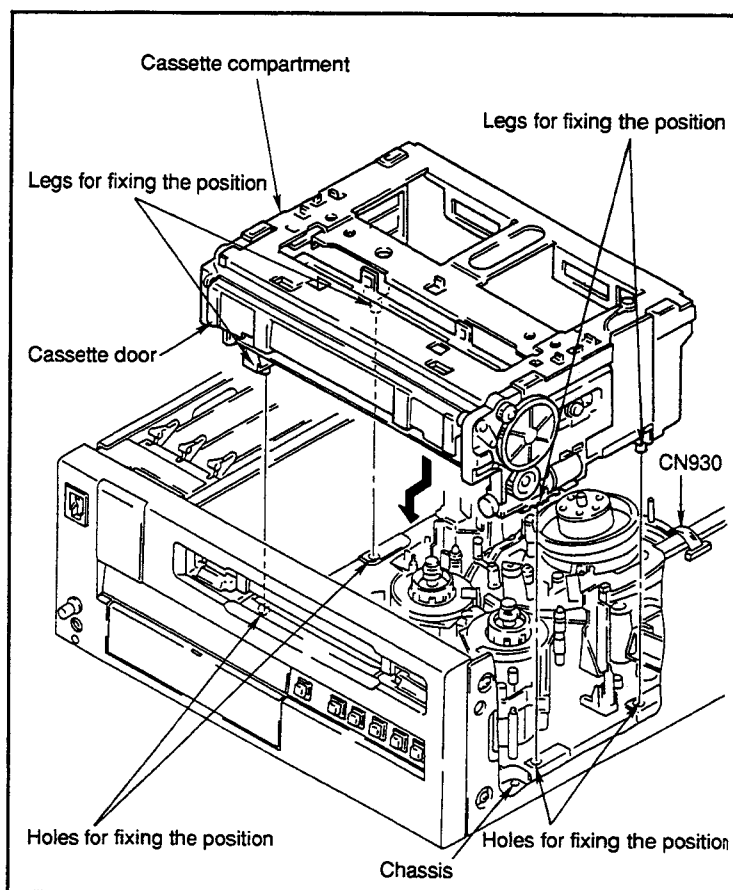


Check : The pinch roller should be in the position as shown in the figure.

# (10) CASSETTE COMPARTMENT Diagnosis



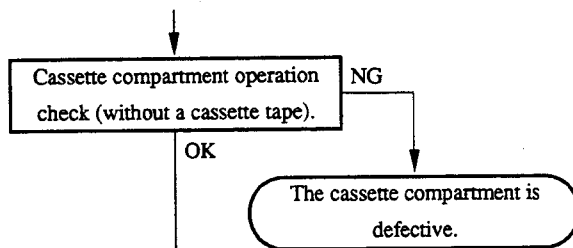
- Installation of the cassette compartment



- Set the harnesses of the connector (CN930) so that it is not put between the chassis.  
Install the cassette compartment.

**Note :** At this time, confirm that the four legs of the cassette compartment for fixing the position are the holes of the chassis for fixing the position.

- After confirming that the cassette compartment is fixed to the chassis, install the cassette compartment stay and connect the connector (CN930) on the CL-25 board.



CASS-COMPARTMENT  
CASS-COMPARTMENT  
NOW CHECKING ...

CANCEL : MENU KEY

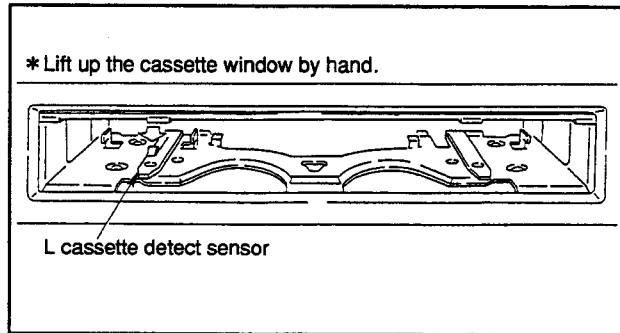
- The unit checks automatically.

Continues to the next page.

4-149 (1800/1800P/1600/1600P)  
4-147 (1400/1400P/1200/1200P)

Checks a L cassette detect sensor.

- Check the operation of the L cassette detect sensor as a preparation to insert a cassette tape.



NG

CASS-COMPARTMENT  
CASSETTE SIZE SWITCH  
PRESS AND CHECK IT.

SMALL IN

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

<How to decide>

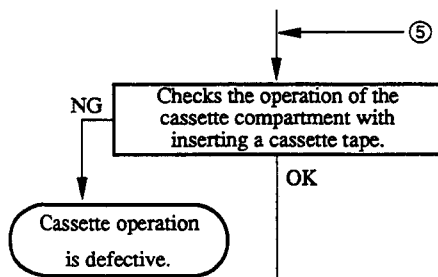
	Not pressing by hand	Pressing by hand	Decision
Display	S CASSETTE	L CASSETTE	OK
	S CASSETTE	S CASSETTE	NG
	L CASSETTE	—	NG

CASS-COMPARTMENT  
AN ERROR HAS BEEN  
DETECTED DURING DIAG.  
EXECUTE DIAGNOSTICS?

NO : NO KEY  
YES : YES KEY

- The sensor is defective.  
When diagnosing the sensor, press the YES key and enter the diagnosis of the sensor.





CASS-COMPARTMENT

INSERT A CASSETTE TAPE.

PREVIOUS : (←) KEY  
CANCEL : MENU KEY

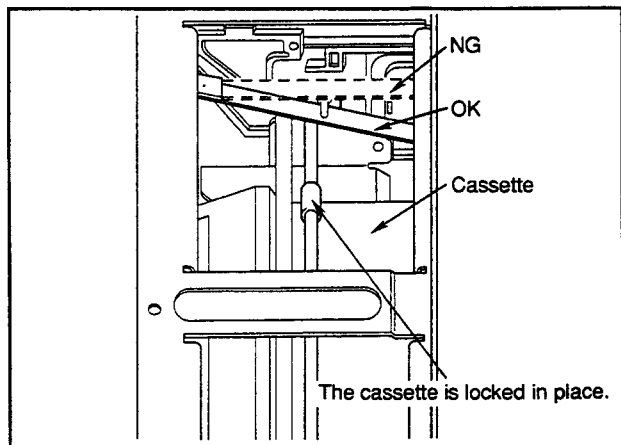
- Insert a large or small cassette tape into the unit.

CASS-COMPARTMENT

IS THE CASSETTE LOCKED IN PLACE?

NO : NO KEY  
YES : YES KEY  
CANCEL : MENU KEY

NG



CASS-COMPARTMENT

FOLLOWING PART IS DEFECTIVE.

• CASSETTE COMPARTMENT

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The cassette compartment without pressing a cassette tape surely is installed.  
Replace or repair the cassette compartment.

Continues to the next page.

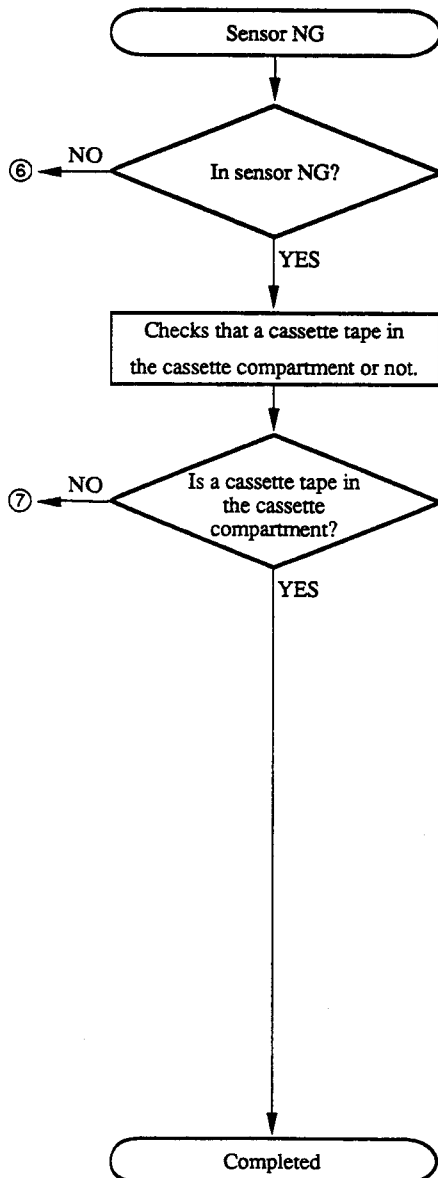


CASS-COMPARTMENT

CHECK COMPLETED.

NEXT : (→) KEY  
PREVIOUS : (←) KEY

- When you would like to check the operation of the cassette compartment as to both large and small cassette tape, press the (←) key and insert the cassette tape of another size into the unit.



CASS-COMPARTMENT

DOES A CASSETTE TAPE  
EXIST IN THE CASS-COMP. ?

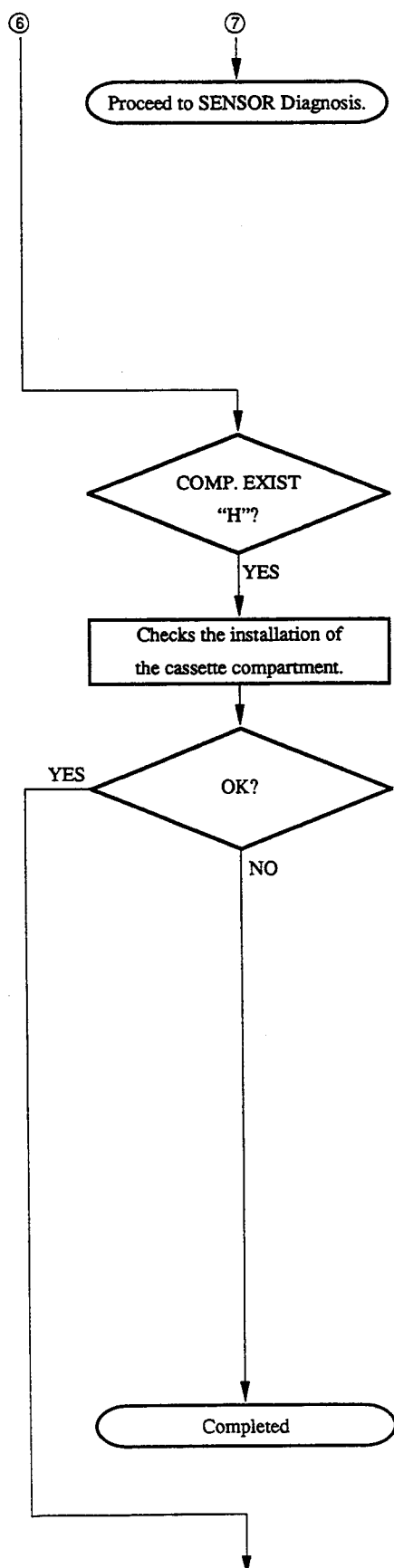
NO : NO KEY  
YES : YES KEY  
CANCEL : MENU KEY

CASS-COMPARTMENT

EJECT A CASSTTE TAPE.

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

4-152 (1800/1800P/1600/1600P)  
4-150 (1400/1400P/1200/1200P)



CASS-COMPARTMENT

AN ERROR HAS BEEN  
DETECTED DURING DIAG.  
EXECUTE DIAGNOSTICS?

NO : NO KEY  
YES : YES KEY

CASS-COMPARTMENT

IS CASS-COMPARTMENT  
CORRECTLY IN PLACE?

NO : NO KEY  
YES : YES KEY  
CANCEL : MENU KEY

- Check that harnesses are connected correctly or not.

CASS-COMPARTMENT

DISCONTINUE DIAGNOSTICS,  
POWER OFF AND INSTALL  
A CASS-COMPARTMENT.

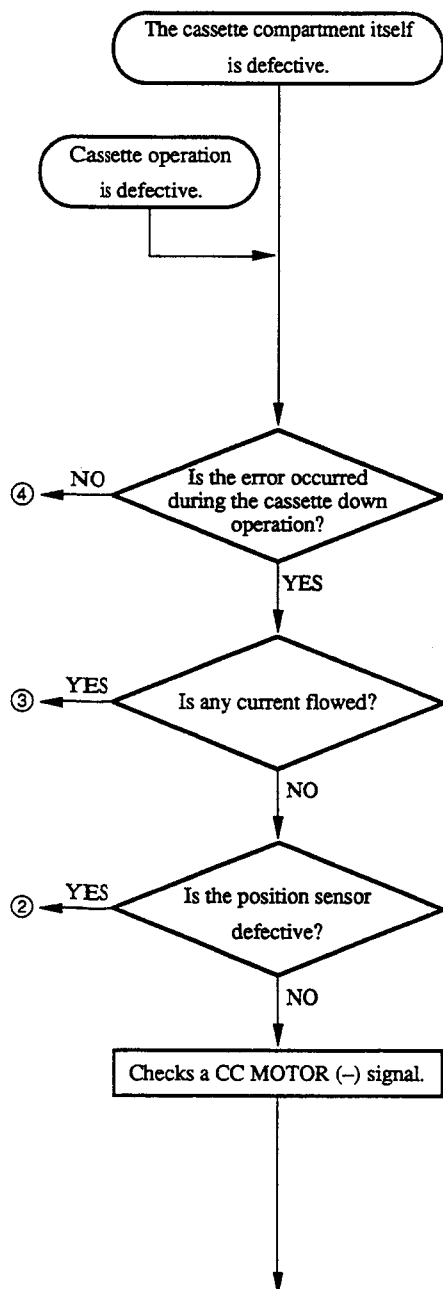
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

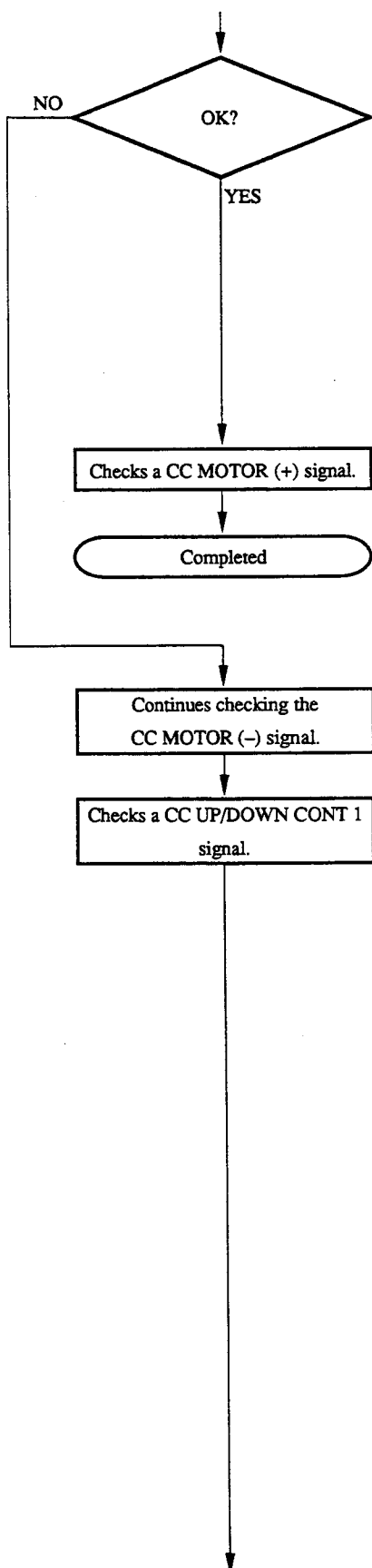
Continues to the next page.

↓  
Proceed to SENSOR Diagnosis.

CASS-COMPARTMENT  
AN ERROR HAS BEEN  
DETECTED DURING DIAG.  
EXECUTE DIAGNOSTICS?  
  
NO : NO KEY  
YES : YES KEY

CASS-COMPARTMENT  
CASS-COMPARTMENT  
TIME OVER.  
  
NEXT : (→) KEY  
CANCEL : MENU KEY





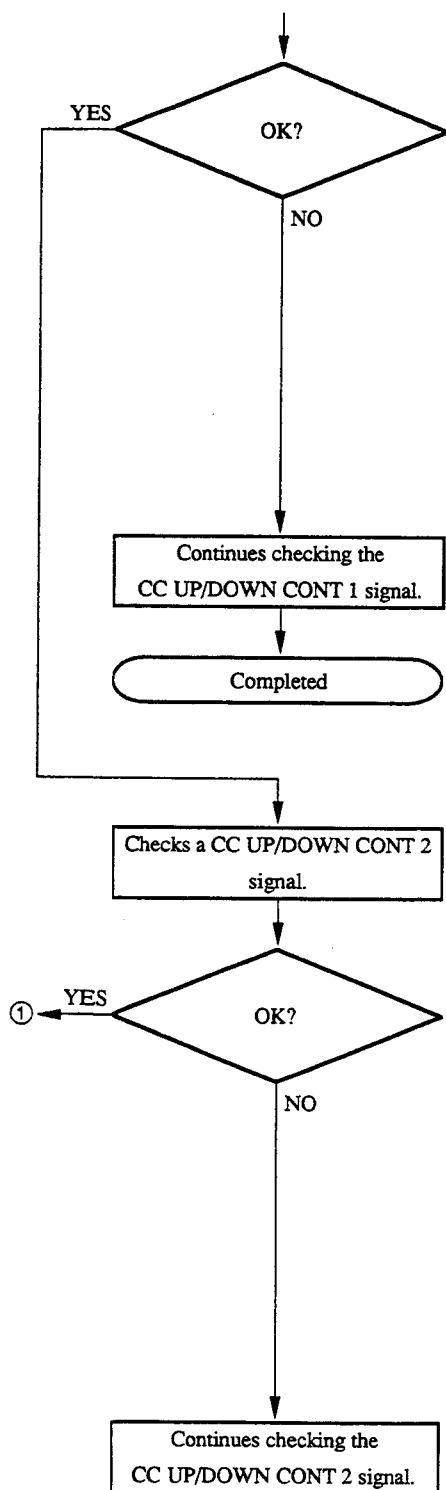
```

CASS-COMPARTMENT °
• CN930-11/CASS-COMP
THE VOLTAGE VALUE <A>
IS PERMISSIBLE LIMIT
WHILE PRESSING (↑)KEY?
A > 10 V

NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- Check that the voltage (A) is more than 10 V while pressing the (↑) key.

Continues to the next page.



CASS-COMPARTMENT

- IC153-1/DR  
THE VOLTAGE VALUE <A>  
IS PERMISSIBLE LIMIT  
WHILE PRESSING (↑)KEY?  
A < 1 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC153/DR-214 (L-2)

- Check that the voltage (A) is less than 1 V while pressing the (↑) key.

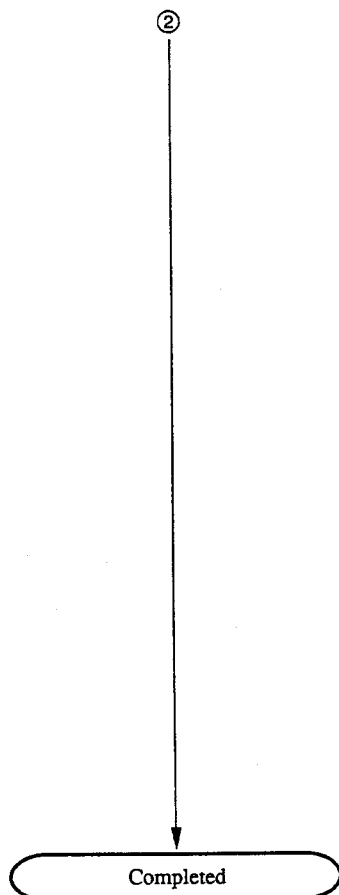
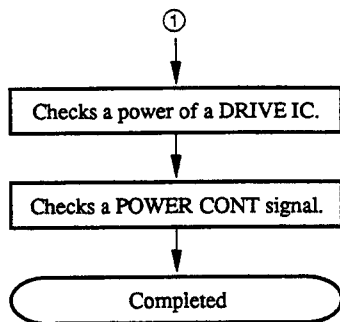
CASS-COMPARTMENT

- IC153-2/DR  
THE VOLTAGE VALUE <A>  
IS PERMISSIBLE LIMIT  
WHILE PRESSING (↑)KEY?  
A > 4 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC153/DR-214 (L-2)

- Check that the voltage (A) is more than 4 V while pressing the (↑) key.



```

CASS-COMPARTMENT
CASS-COMP. POSITION
NO GOOD.

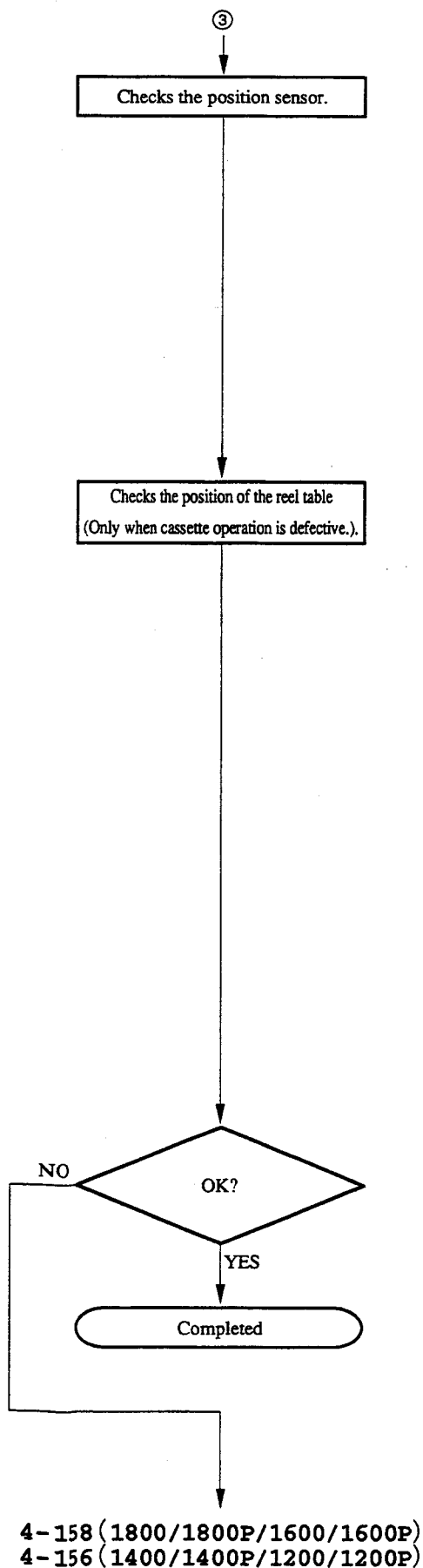
NEXT : (→) KEY
CANCEL : MENU KEY
  
```

```

CASS-COMPARTMENT
SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
1 HARNESS(CASS.-MS)
1 CASSETTE COMPARTMENT
2 MS BOARD

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- A cassette compartment position sensor does not operate correctly.  
Check harnesses. When the harnesses are not defective, replace a cassette compartment to a new one.



CASS-COMPARTMENT

PRESS (↑)/(↓)KEYS AND  
CHECK THE COMPARTMENT  
POSITION SENSOR.

HORIZON

UP : (↑) KEY

DOWN : (↓) KEY

NG : NO KEY

OK : YES KEY

PREVIOUS : (←) KEY

CANCEL : MENU KEY

- Check that the information display of the position sensors is changed by moving the cassette compartment with pressing the (↑) or (↓) key.

CASS-COMPARTMENT

IS THE REEL TABLES  
IN THE S-POSITION?

NO : NO KEY

YES : YES KEY

PREVIOUS : (←) KEY

CANCEL : MENU KEY

CASS-COMPARTMENT

IS THE REEL TABLES  
IN THE L-POSITION?

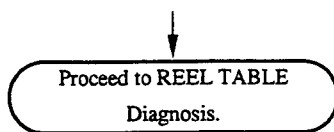
NO : NO KEY

YES : YES KEY

PREVIOUS : (←) KEY

CANCEL : MENU KEY

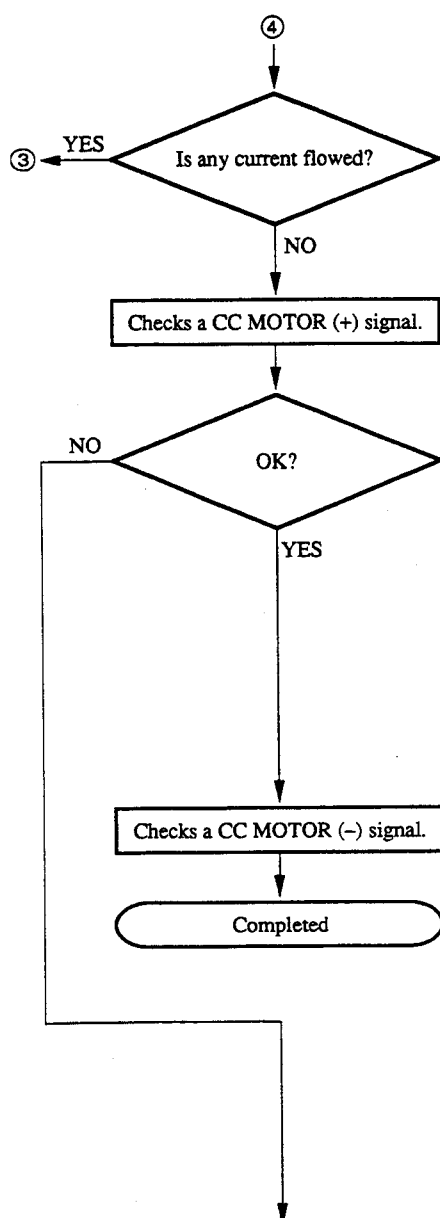




CASS-COMPARTMENT

AN ERROR HAS BEEN  
DETECTED DURING DIAG.  
EXECUTE DIAGNOSTICS?

NO : NO KEY  
YES : YES KEY



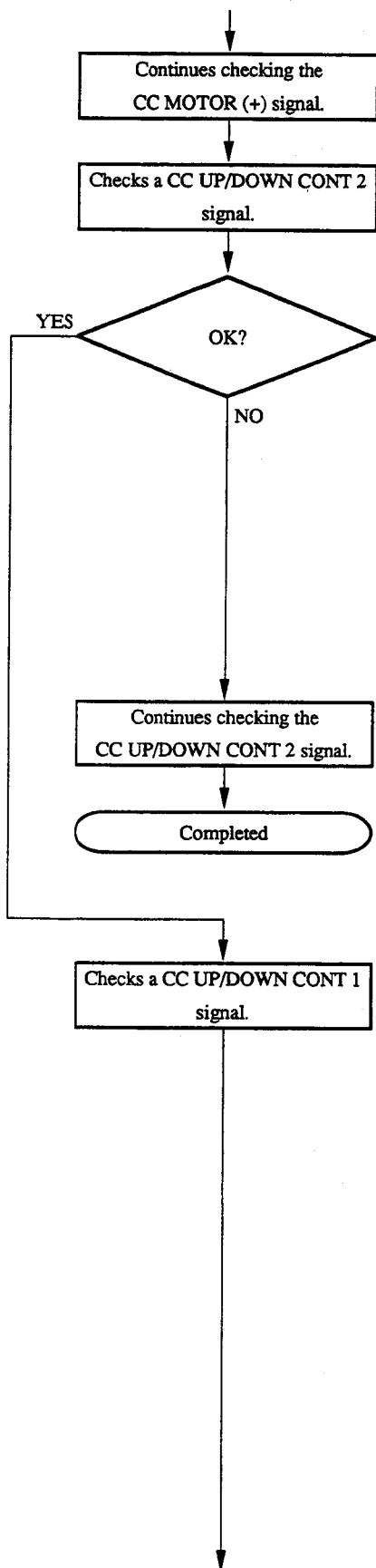
CASS-COMPARTMENT

• CN930-12/CASS-COMP  
THE VOLTAGE VALUE <A>  
IS PERMISSIBLE LIMIT  
WHILE PRESSING (↑)KEY?  
A > 10 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check that the voltage (A) is more than 10 V while pressing the (↑) key.

Continues to the next page.



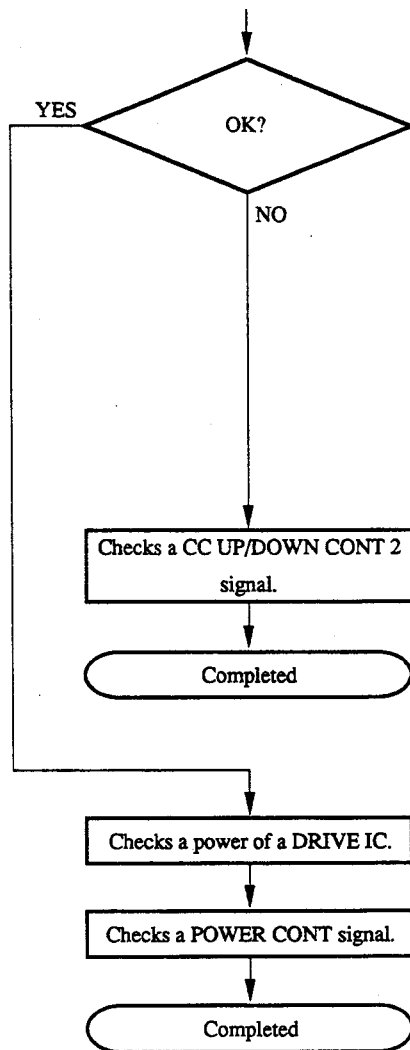
CASS-COMPARTMENT

- IC153-2/DR  
THE VOLTAGE VALUE <A>  
IS PERMISSIBLE LIMIT  
WHILE PRESSING (↑)KEY?  
A < 1 V
- NO : NO KEY
- YES : YES KEY
- PREVIOUS : (←) KEY
- CANCEL : MENU KEY

• IC153/DR-214 (L-2)

- Checks that the voltage (A) is less than 1 V while pressing the (↑) key.

4-160 (1800/1800P/1600/1600P)  
4-158 (1400/1400P/1200/1200P)



CASS-COMPARTMENT

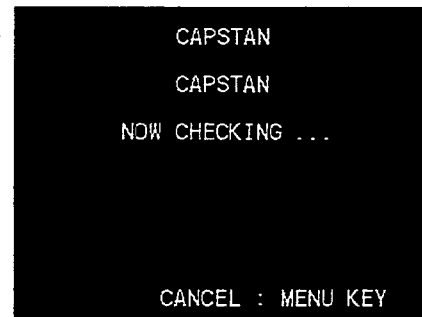
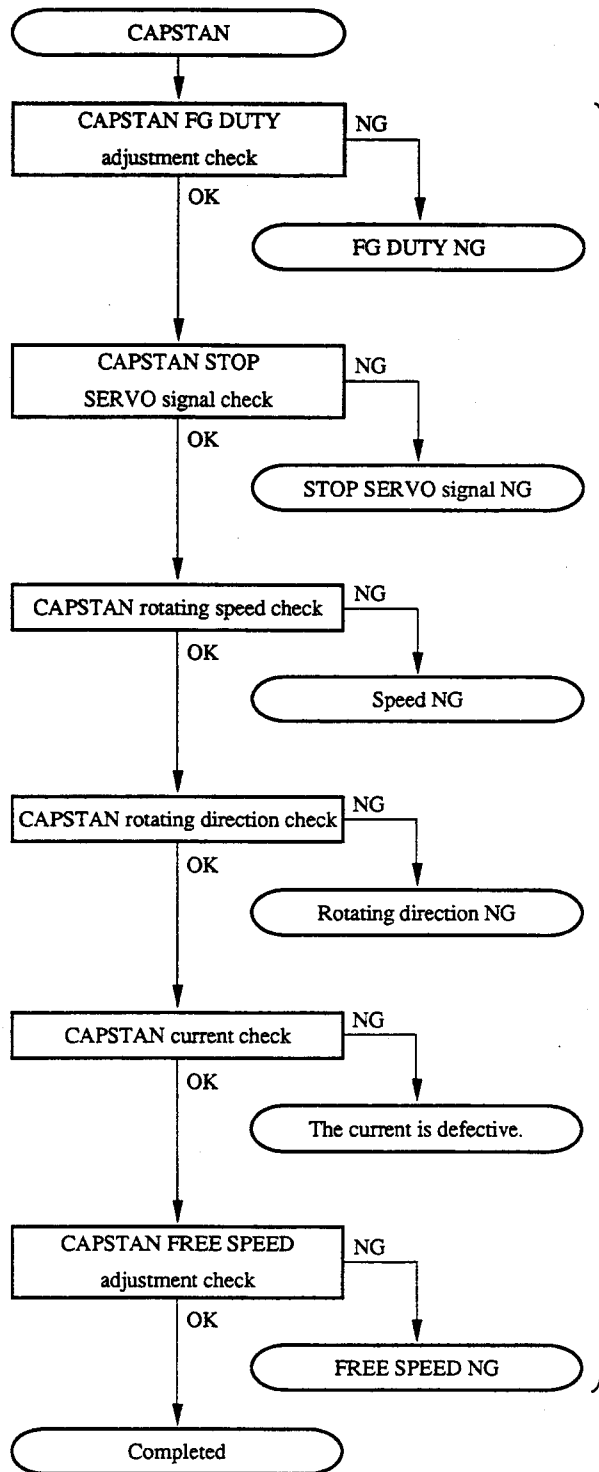
- IC153-1/DR  
THE VOLTAGE VALUE <A>  
IS PERMISSIBLE LIMIT  
WHILE PRESSING (↑)KEY?  
A > 4 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

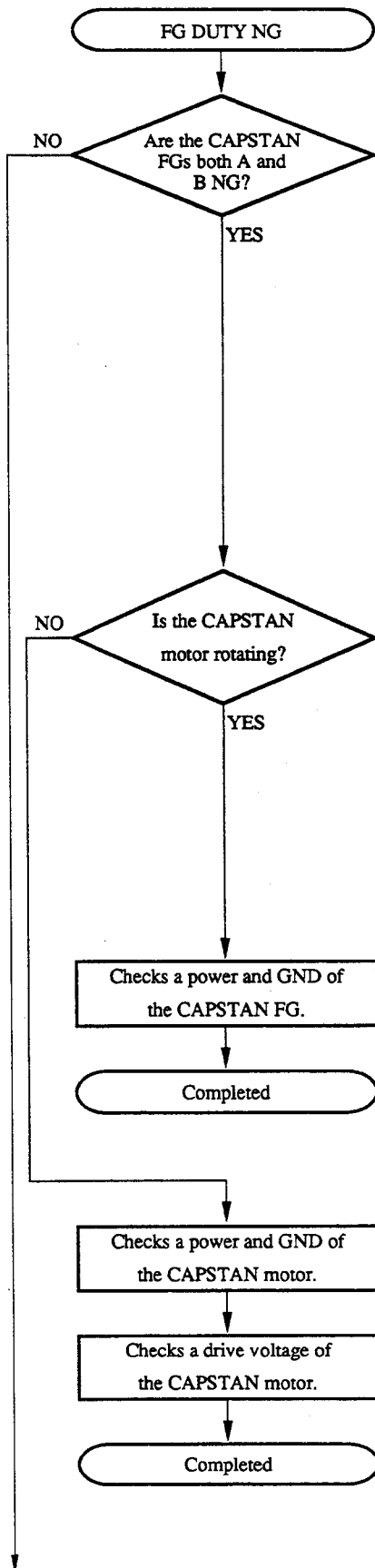
- IC153/DR-214 (L-2)

- Checks that the voltage (A) is more than 4 V while pressing the (↑) key.

# (11) CAPSTAN Diagnosis



- The unit checks automatically.



CAPSTAN

CAPSTAN FG  
COULD NOT BE FOUND.

NEXT : (→) KEY  
CANCEL : MENU KEY

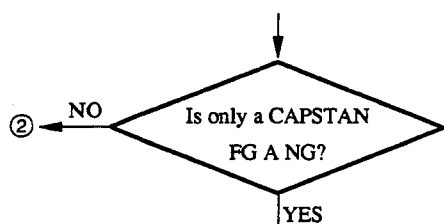
CAPSTAN

CAPSTAN  
IS THE MOTOR ROTATING?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check that the capstan motor is rotating or not.

Continues to the next page.



CAPSTAN

CAPSTAN FG A  
COULD NOT BE FOUND.

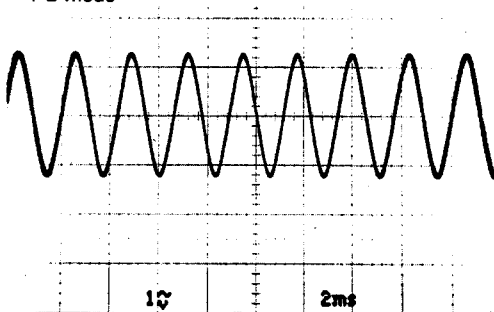
NEXT : (→) KEY  
CANCEL : MENU KEY

CAPSTAN

- CN355-3/MS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN355-3/MS-39 (D-3) waveform  
PB mode



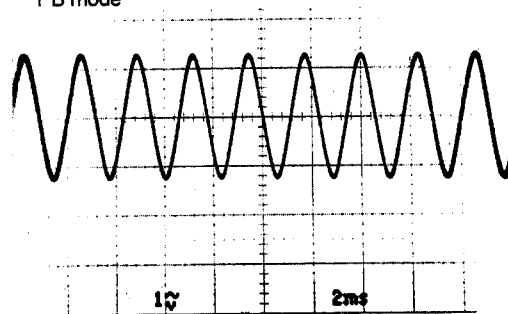
4-164 (1800/1800P/1600/1600P)  
4-162 (1400/1400P/1200/1200P)

# CAPSTAN

- CN302-7/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN302-7/DR-214 (H-5) waveform  
PB mode

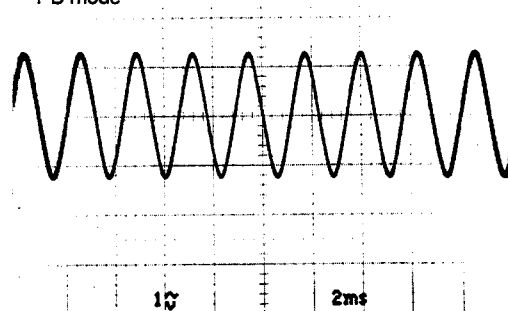


# CAPSTAN

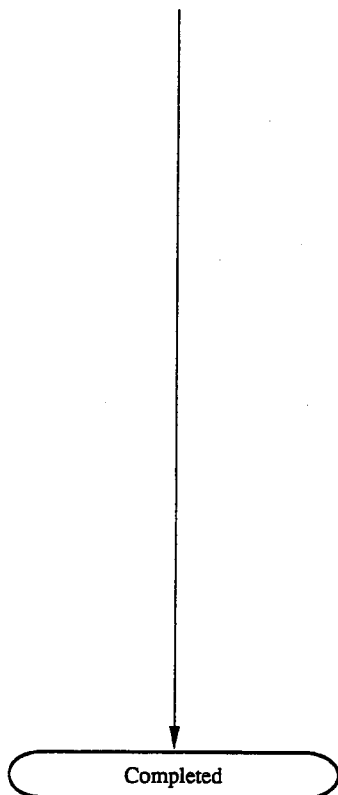
- CN300-24B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN300-24B/DR-214 (H-1) waveform  
PB mode



Continues to the next page.

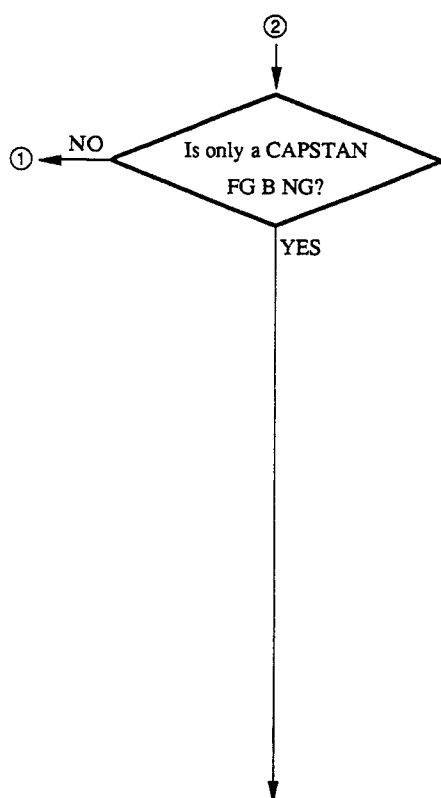
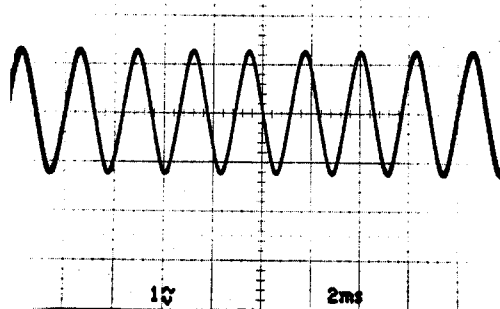


CAPSTAN

- CN108-8A/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN108-8A/SS-53 (K-6) waveform  
PB mode



CAPSTAN

CAPSTAN FG B  
COULD NOT BE FOUND.

NEXT : (→) KEY  
CANCEL : MENU KEY

4-166 (1800/1800P/1600/1600P)  
4-164 (1400/1400P/1200/1200P)



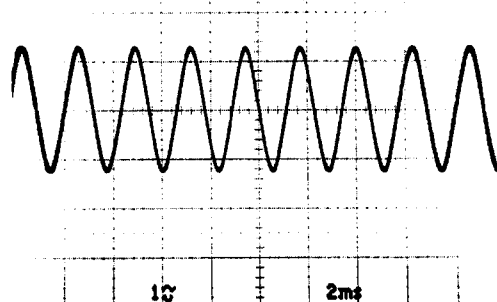
Checks the CAPSTAN  
FG B signal.

CAPSTAN

- CN355-2/MS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN355-2/MS-39 (D-3) waveform  
PB mode

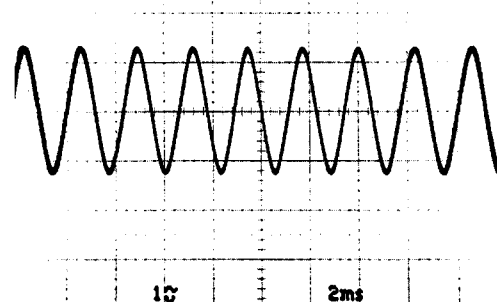


CAPSTAN

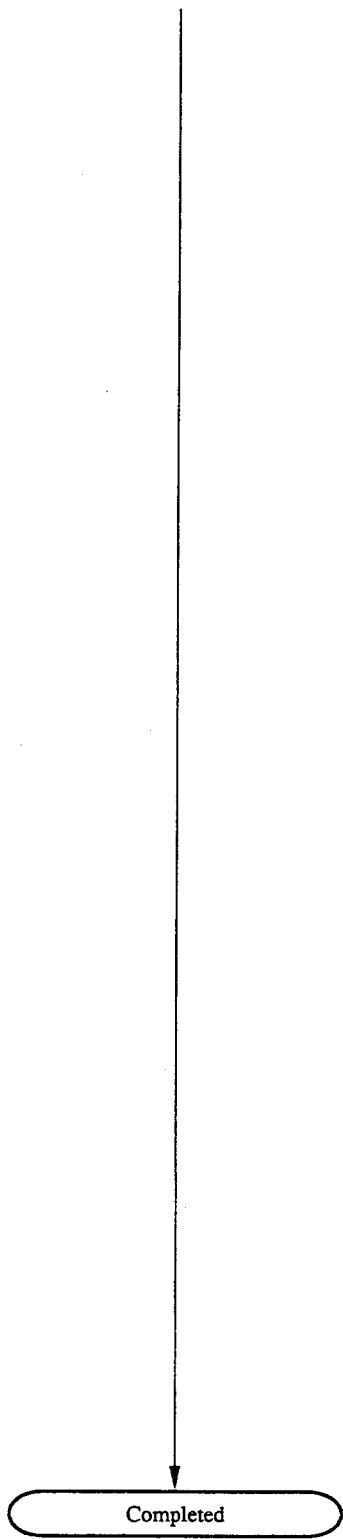
- CN302-8/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN302-8/DR-214 (H-5) waveform  
PB mode



Continues to the next page.

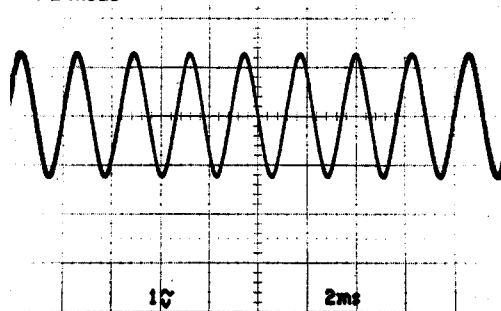


CAPSTAN

- CN300-25B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN300-25B/DR-214 (H-1) waveform  
PB mode

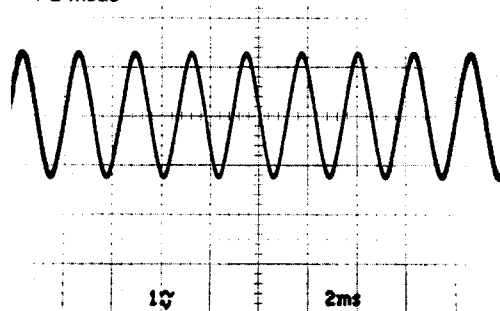


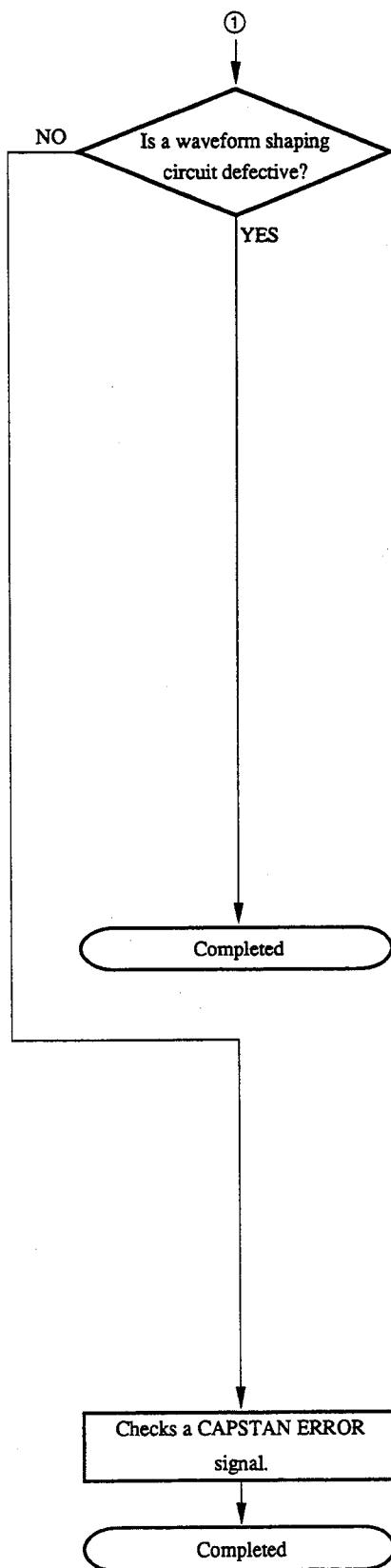
CAPSTAN

- CN108-8B/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN108-8B/SS-53 (K-6) waveform  
PB mode





CAPSTAN  
CAPSTAN FG SHAPER  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY

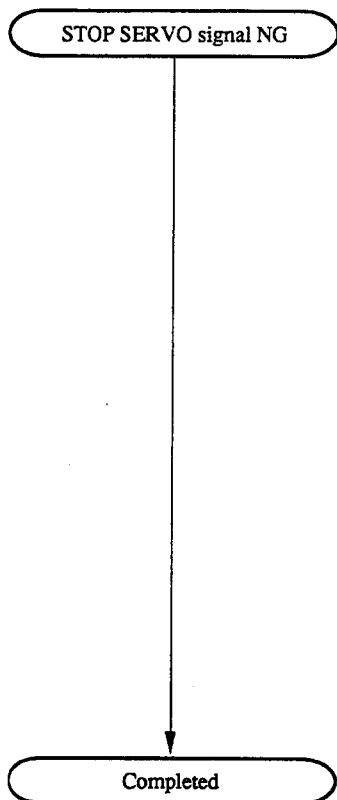
CAPSTAN  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 SS BOARD  
1 ADJUST +5V LINE

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that a ADJUST +5 V signal is not supplied to the SS board.

CAPSTAN  
CAPSTAN FG DUTY ADJUST  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY



CAPSTAN

STOP SERVO  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY

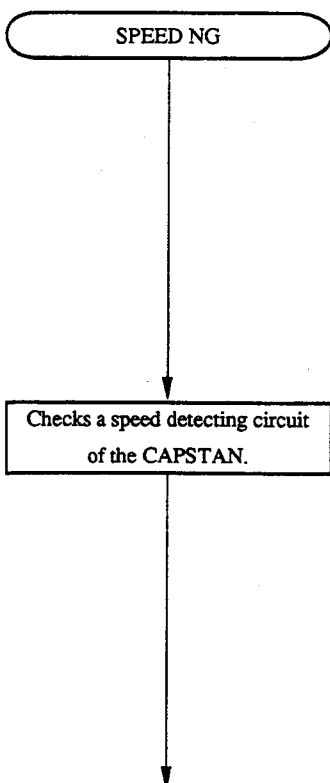
CAPSTAN

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 SS BOARD  
1 ADJUST +5V LINE

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that a ADJUST +5 V signal is not supplied to the SS board.



CAPSTAN

CAPSTAN SPEED  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY

CAPSTAN

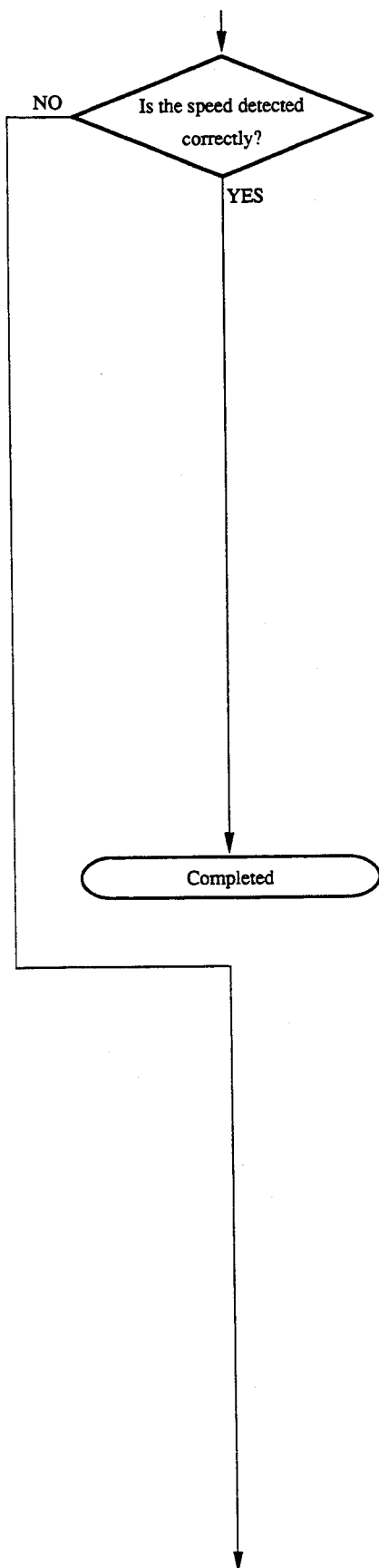
CAPSTAN SPEED DETECTOR

NOW CHECKING ...

CANCEL : MENU KEY

- The unit checks automatically.

4-170 (1800/1800P/1600/1600P)  
4-168 (1400/1400P/1200/1200P)



CAPSTAN

CAPSTAN SPEED DETECTOR  
CHECKES COMPLETED.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

CAPSTAN

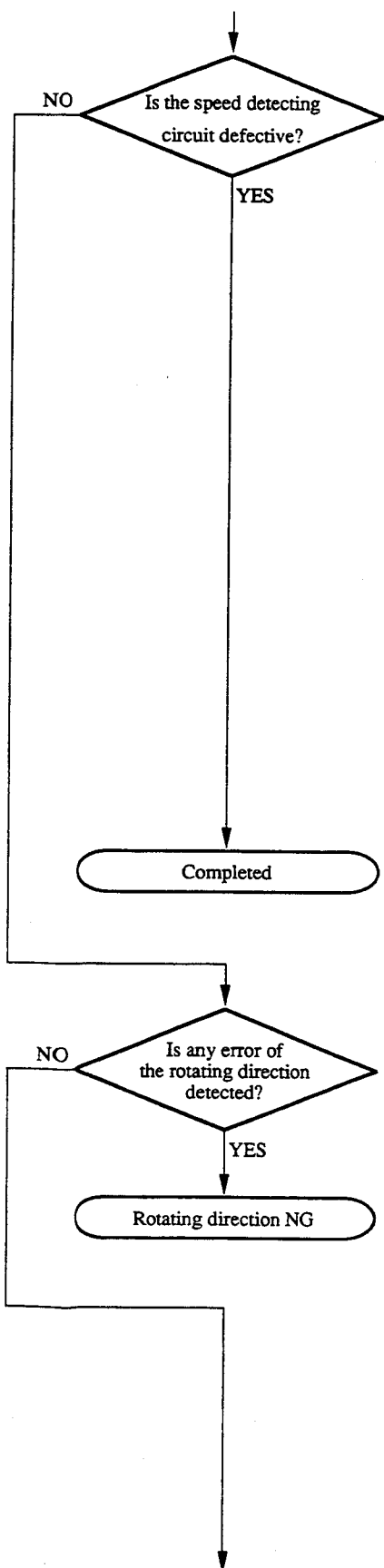
DEFECT COULD NOT BE  
FOUND.

NEXT : (→) KEY  
PREVIOUS : (←) KEY

- Check that the connections of harnesses and so on are faulty or not.

Continues to the next page.

4-171 (1800/1800P/1600/1600P)  
4-169 (1400/1400P/1200/1200P)



CAPSTAN

CAPSTAN SPEED DETECTOR  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

CAPSTAN

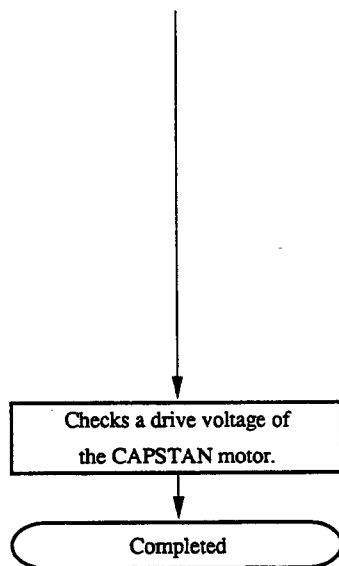
FOLLOWING PART IS  
DEFECTIVE.

- SS BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that the capstan 2FG circuit on the SS board is defective.

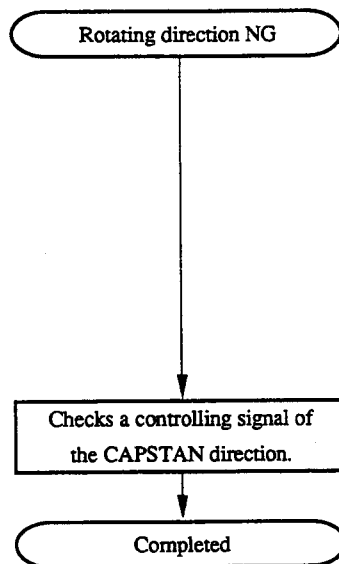
4-172 (1800/1800P/1600/1600P)  
4-170 (1400/1400P/1200/1200P)



CAPSTAN

CAPSTAN SPEED  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



CAPSTAN

CAPSTAN DIRECTION  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

Current NG



Completed

CAPSTAN  
CAPSTAN MOTOR CURRENT  
NO GOOD.  
  
NEXT : (→) KEY  
CANCEL : MENU KEY

CAPSTAN  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 DR BOARD  
1 CAPSTAN MOTOR  
2 SS BOARD  
  
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that the capstan current detecting circuit is defective or an extraordinary current is flowing through the capstan motor.

FREE SPEED NG



CAPSTAN  
CAPSTAN SPEED  
NO GOOD.  
  
NEXT : (→) KEY  
CANCEL : MENU KEY

4-174 (1800/1800P/1600/1600P)  
4-172 (1400/1400P/1200/1200P)



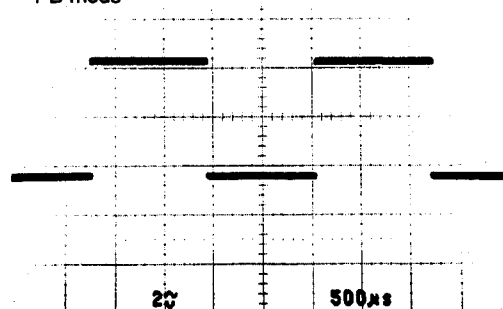
Checks a CAPSTAN  
FG A NORM. signal.

CAPSTAN

- IC219-7/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- IC219-7/SS-53 (H-1) waveform  
PB mode

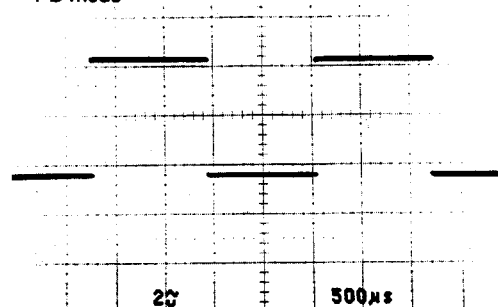


CAPSTAN

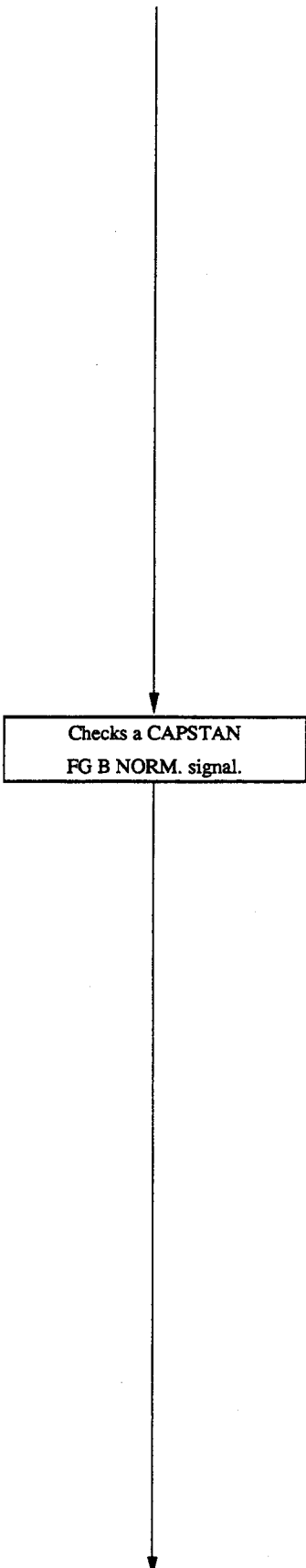
- CN300-27B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN300-27B/DR-214 (H-1) waveform  
PB mode



Continues to the next page.



Checks a CAPSTAN  
FG B NORM. signal.

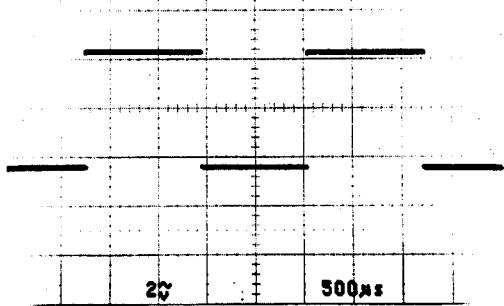
4-176 (1800/1800P/1600/1600P)  
4-174 (1400/1400P/1200/1200P)

CAPSTAN

- CN108-9B/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN108-9B/SS-53 (K-6) waveform  
PB mode

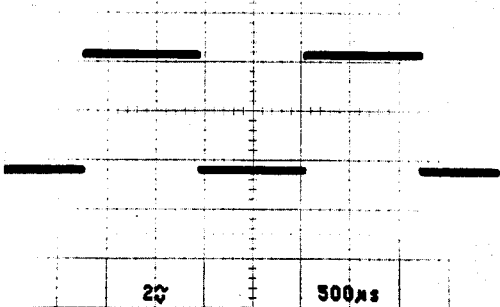


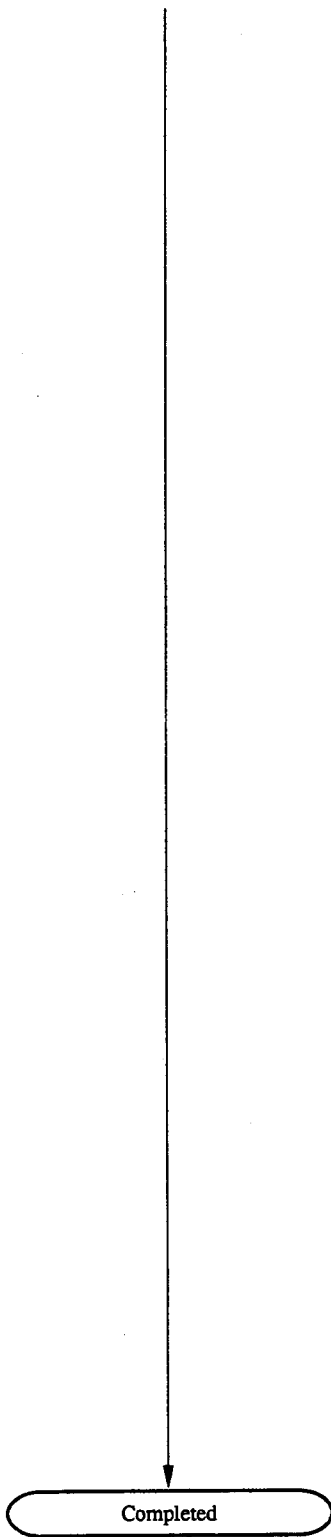
CAPSTAN

- IC219-6/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC219-6/SS-53 (H-1) waveform  
PB mode



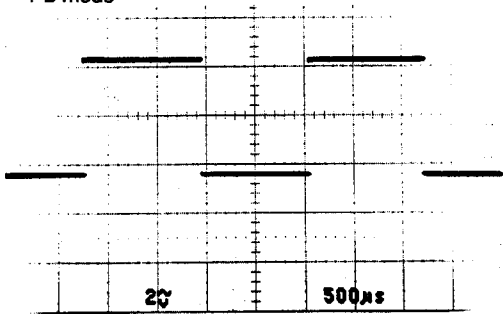


CAPSTAN

- CN300-28B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN300-28B/DR-214 (H-1) waveform  
PB mode

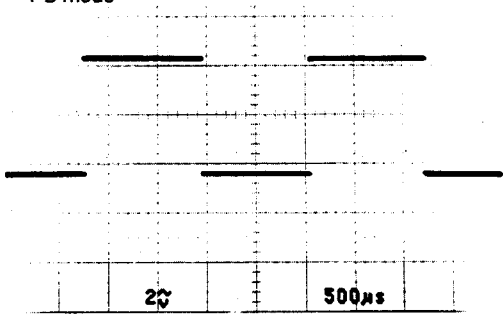


CAPSTAN

- CN108-10A/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN108-10A/SS-53 (K-6) waveform  
PB mode



When detecting any error on  
an adjusting data.



Completed

CAPSTAN  
CAPSTAN ADJUST DATA  
NO GOOD.  
  
NEXT : (→) KEY  
CANCEL : MENU KEY

CAPSTAN  
CAPSTAN MOTOR  
READJUST OR CHANGE IT.  
  
CANCEL : MENU KEY

When detecting any error on  
a speed deviation.

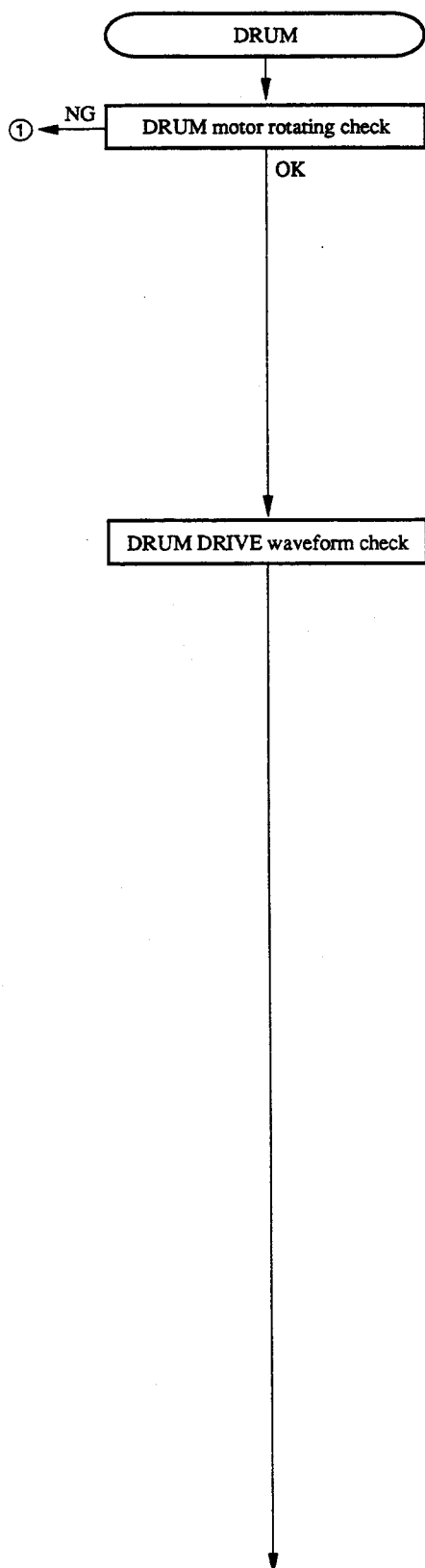


Completed

CAPSTAN  
CAPSTAN MOTOR SHAFT  
NO GOOD.  
  
NEXT : (→) KEY  
CANCEL : MENU KEY

CAPSTAN  
CAPSTAN  
CLEAN OR REPLACE.  
  
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

## (12) DRUM Diagnosis



```

DRUM
DRUM
NOW CHECKING ...

CANCEL : MENU KEY
    
```

- The unit checks automatically.

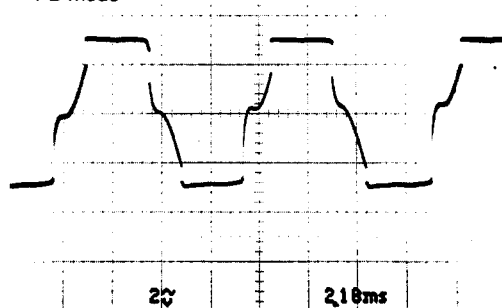
```

DRUM

• CN301-1/DR
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
CANCEL : MENU KEY
    
```

- CN301-1/DR-214 (C-5) waveform PB mode



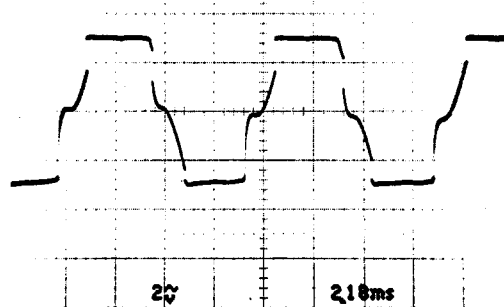
Continues to the next page.

DRUM

• CN301-3/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN301-3/DR-214 (C-5) waveform  
PB mode

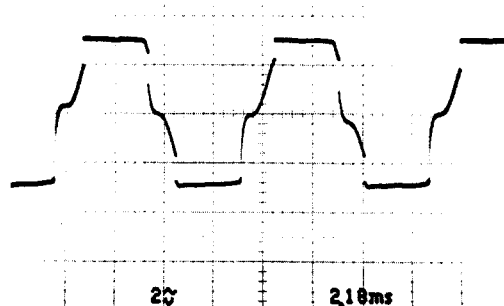


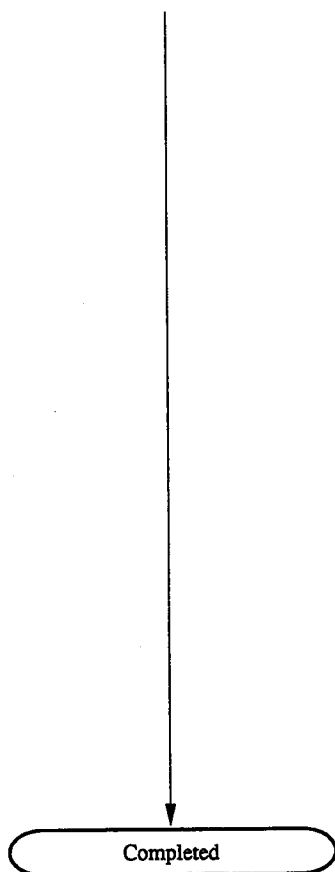
DRUM

• CN301-5/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN301-5/DR-214 (C-5) waveform  
PB mode





```
DRUM

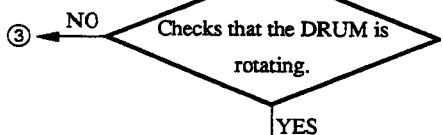
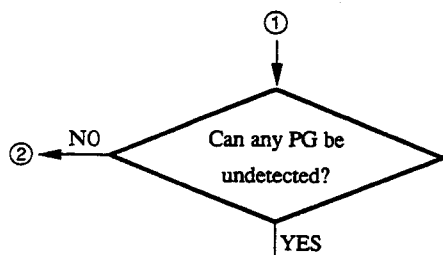
SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
1 HARNESS(DRUM-MS)
1 HARNESS(MS-DR)
2 DRUM MOTOR
3 DR BOARD
CONTINUED...
NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
```

```
DRUM

SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
4 MS BOARD

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
```

- A drum might rotate unless the drum drive waveform is not normal. The drum might not rotate depending on the position after starting the drum.  
Check the connection between the drum and the DR board.



```

DRUM
DRUM PG
COULD NOT BE FOUND.

NEXT : (→) KEY
CANCEL : MENU KEY
  
```

```

DRUM
DRUM
IS THE MOTOR ROTATING?

NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- Check that the DRUM motor is rotating or not.



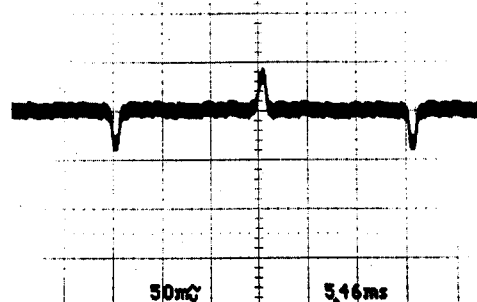
Checks a PG input signal.

DRUM

- CN301-8/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN301-8/DR-214 (C-5) waveform  
PB mode

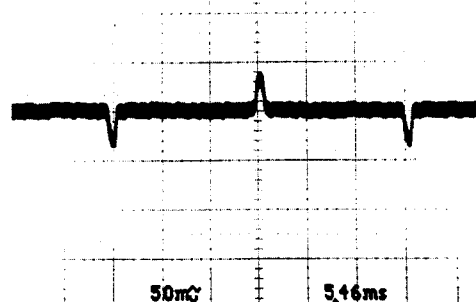


DRUM

- CN301-9/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN301-9/DR-214 (C-5) waveform  
PB mode



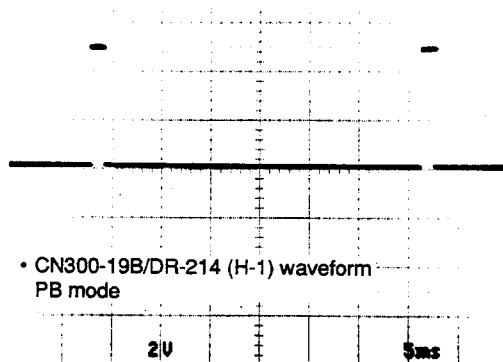
Continues to the next page.

Checks a DRUM PG PULSE  
signal.

DRUM

- CN300-19B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

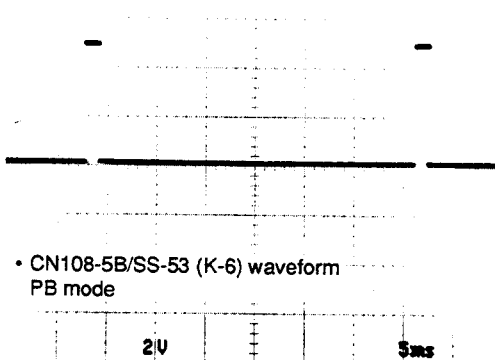
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



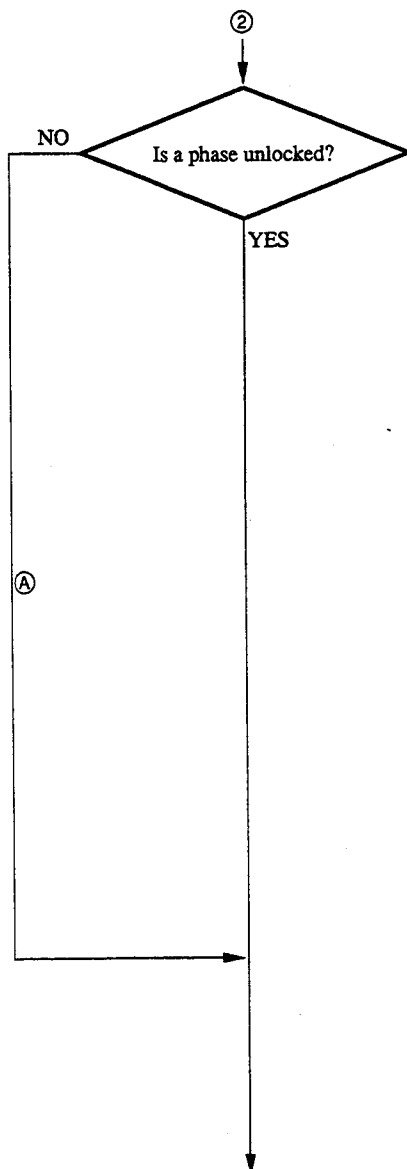
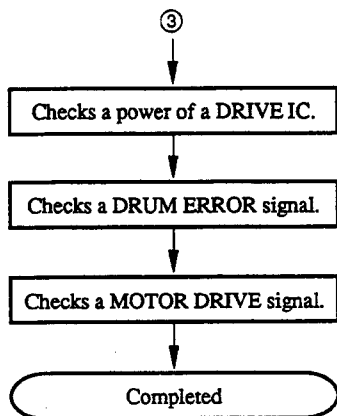
DRUM

- CN108-5B/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



Completed



DRUM  
 DRUM PG LOCK  
 NO GOOD.

NEXT : (→) KEY  
 CANCEL : MENU KEY

②

DRUM  
 DRUM SPEED  
 NO GOOD.

NEXT : (→) KEY  
 CANCEL : MENU KEY

Continues to the next page.

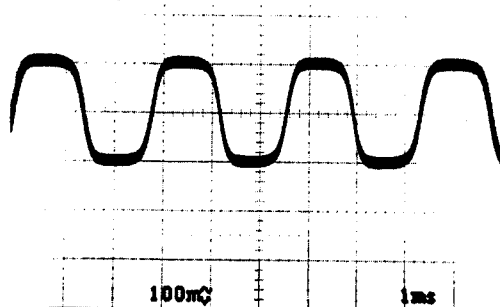
Checks a FG input signal.

DRUM

• CN301-12/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN301-12/DR-214 (C-5) waveform  
PB mode

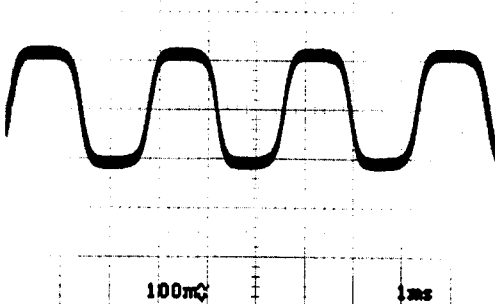


DRUM

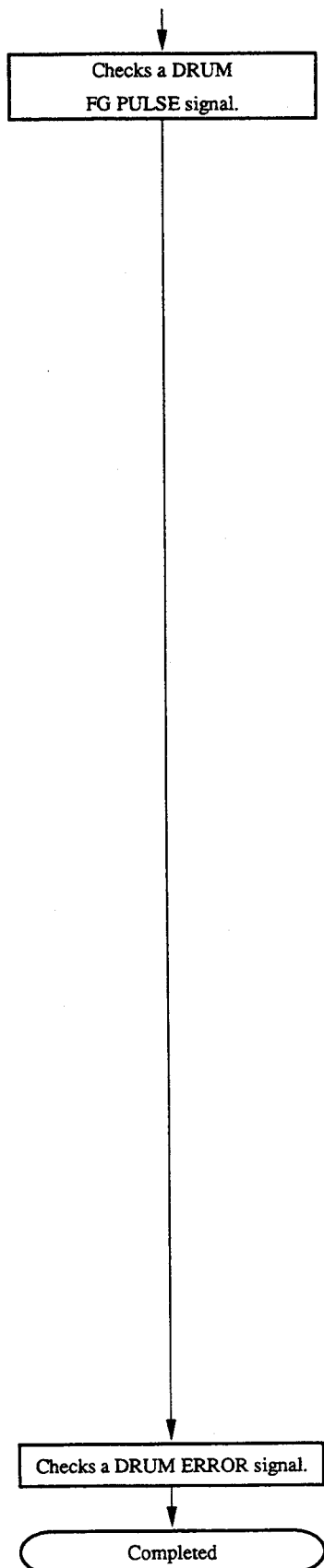
• CN301-14/DR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN301-14/DR-214 (C-5) waveform  
PB mode



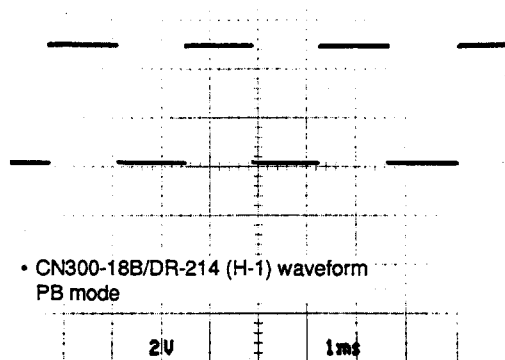
4-186 (1800/1800P/1600/1600P)  
4-184 (1400/1400P/1200/1200P)



DRUM

- CN300-18B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

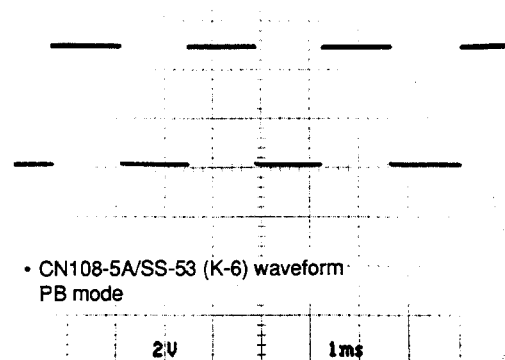
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



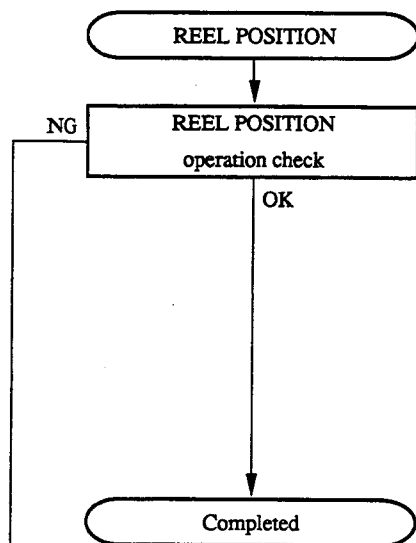
DRUM

- CN108-5A/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



### (13) REEL POSITION Diagnosis



```

REEL POSITION
REEL POSITION
NOW CHECKING ...

CANCEL : MENU KEY
  
```

- The unit checks automatically.

```

REEL POSITION

IS THE REEL TABLES
IN THE S-POSITION?

NO : NO KEY
YES : YES KEY
CANCEL : MENU KEY
  
```

```

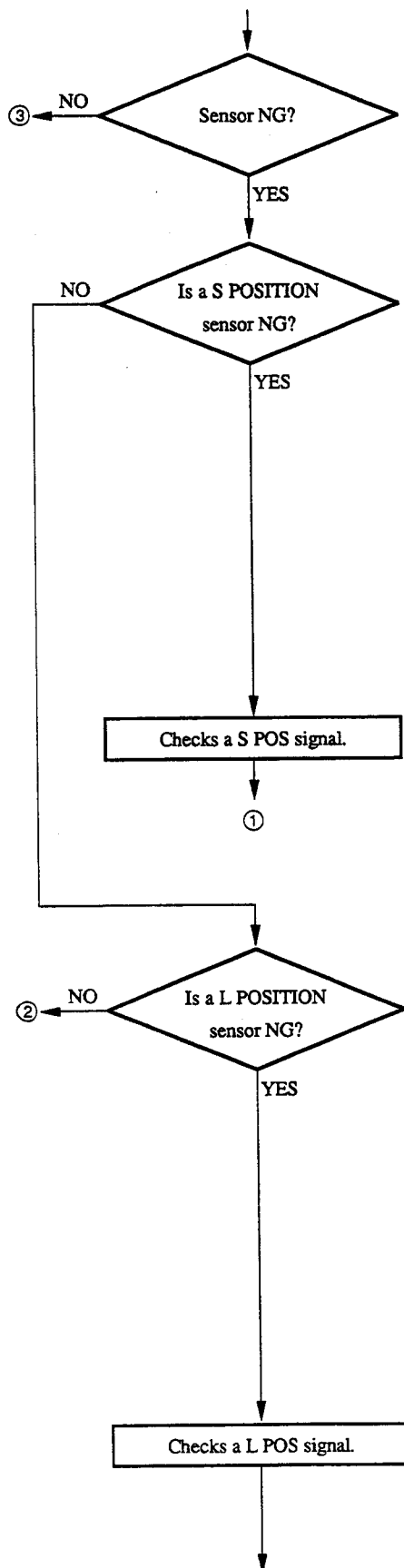
REEL POSITION

IS THE REEL TABLES
IN THE L-POSITION?

NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- Check the position of the reel table.

4-188 (1800/1800P/1600/1600P)  
4-186 (1400/1400P/1200/1200P)



- From the condition of sensors and the result of the Reel Table Position Check, the unit decides that the sensors are NG or not.

```

REEL POSITION
S POSISION SENSOR
NO GOOD.

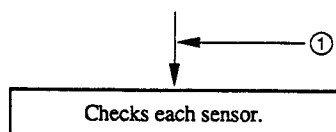
NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

```

REEL POSITION
L POSISION SENSOR
NO GOOD.

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

Continues to the next page.



```

REEL POSITION
PTC-66 BOARD
REMOVE IT.

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- Stop the diagnosis and turn off the power. Remove the PTC-66 board from the unit.

Then, turn on the power while harnesses are connected.

```

REEL POSITION
REEL POSISION SENSOR

S-POSITION SENSOR OFF
L-POSITION SENSOR OFF

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

- Check that the display shows OFF.

Then, check that the display shows ON when the sensor is obstructed by something to cut off a beam of light such as a sheet of black paper.

```

REEL POSITION
DEFECT COULD NOT BE
FOUND.

NEXT : (→) KEY
PREVIOUS : (←) KEY
  
```

- The probable cause is the faulty connections of harnesses and so on.



REEL POSITION  
PTC-66 BOARD  
INSTALL IT AGAIN.

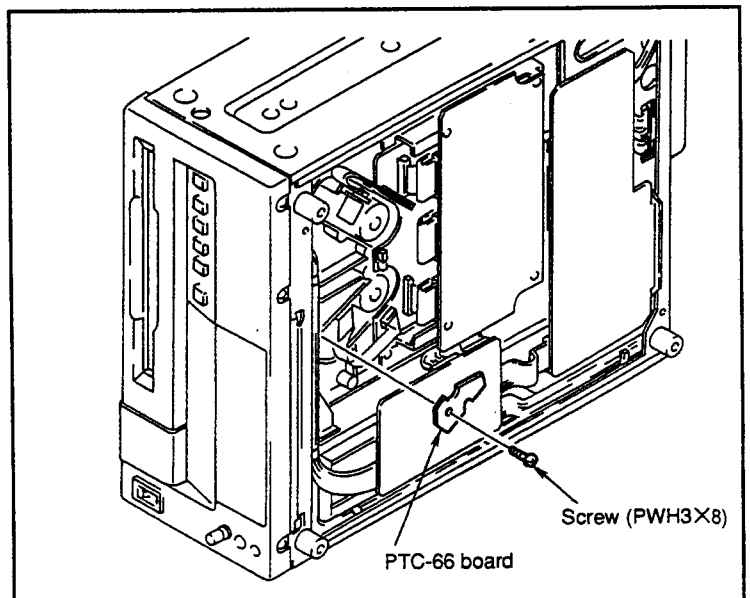
NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Stop the diagnosis and turn off the power. Then, install the removed PTC-66 board.

REEL POSITION  
PTC-66 BOARD  
CHECK INSTILLATION.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

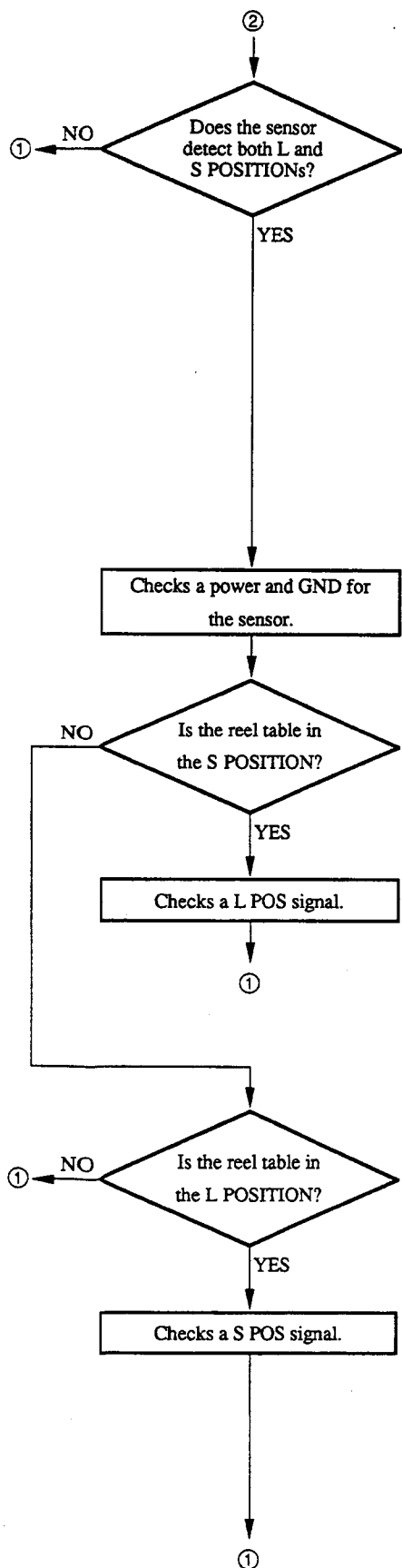
- Install the PTC-66 board.



**Check :** The screw with fixing the board should be tightened.

There should not be clearance between the PTC-66 board and the mechanical parts.

Completed

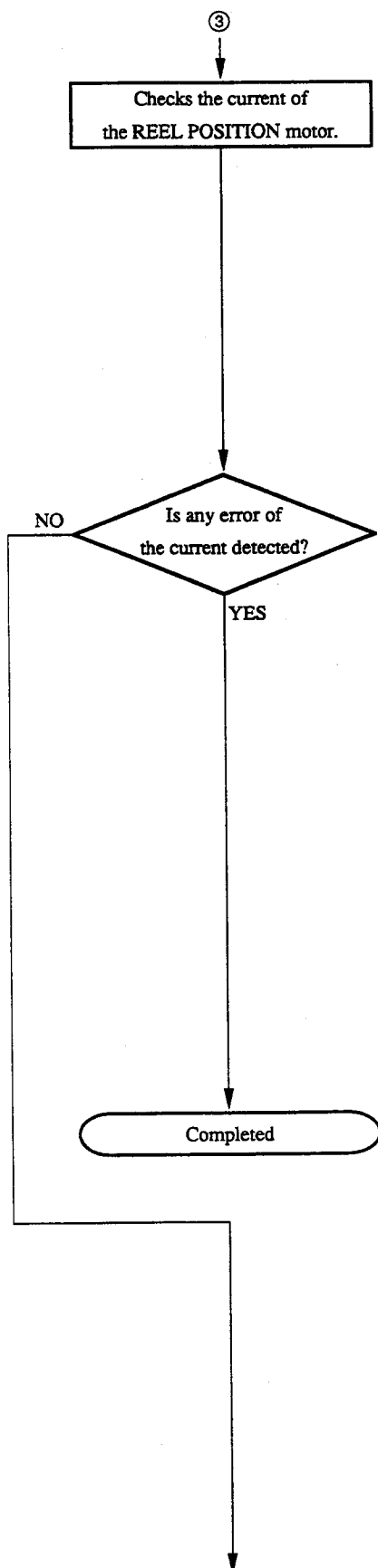


REEL POSITION

REEL POSISION SENSOR  
NO GOOD.

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

4-192 (1800/1800P/1600/1600P)  
4-190 (1400/1400P/1200/1200P)



```

REEL POSITION
REEL POS. MOTOR CURRENT
NOW CHECKING ...

CANCEL : MENU KEY
  
```

- The unit checks automatically.

```

REEL POSITION
REEL POS. MOTOR CURRENT
NO GOOD.

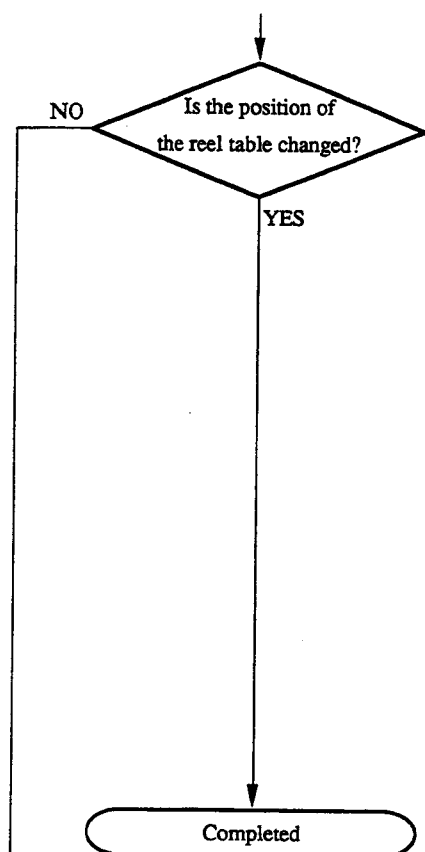
NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

```

REEL POSITION
REEL POSITION
<MECHANICAL TROUBLE>
ROTATE A WARM GEAR AND
CHECK THE ACTIVATION.

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```

Continues to the next page.



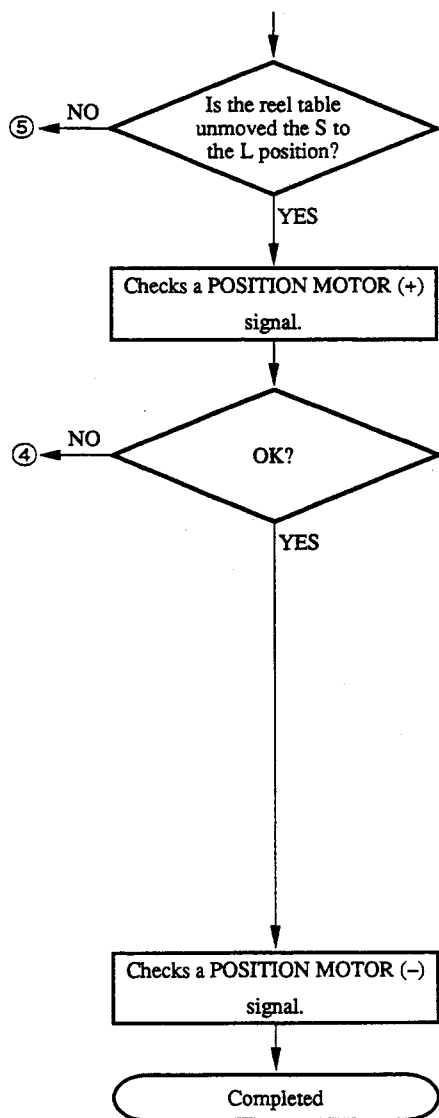
REEL POSITION  
REEL TABLES POSITION  
WAS CHANGED.

NEXT : (→) KEY  
CANCEL : MENU KEY

REEL POSITION  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 HARNESS(PTC-66-MS)  
1 REEL POSITION MOTOR  
2 MS BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is the faulty connections of harnesses and so on.



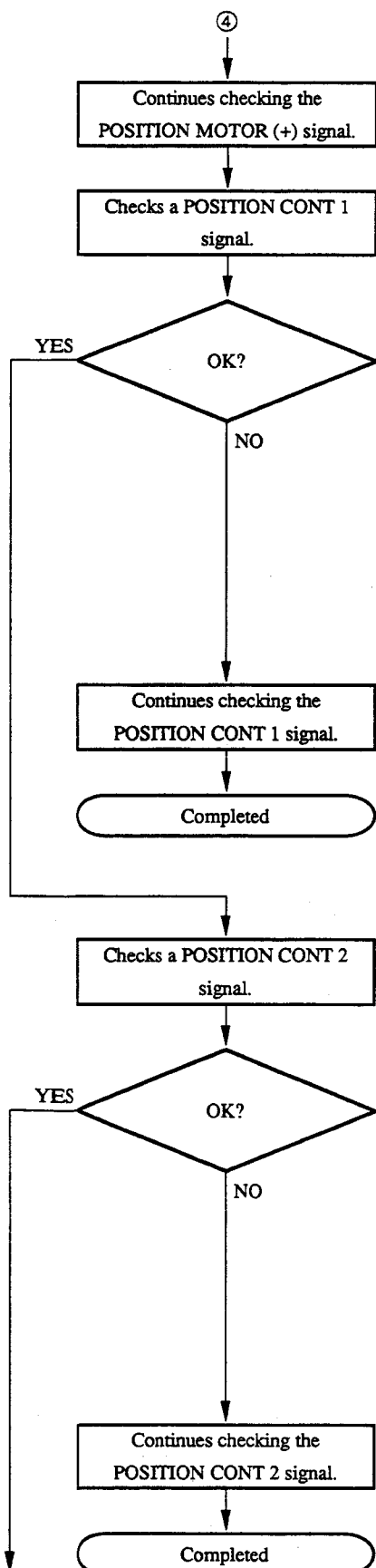
```

REEL POSITION
• CN352-2/MS
IS THE VOLTAGE VALUE <A>
PERMISSIBLE LIMIT?

A > 10 V

NO : NO KEY
YES : YES KEY
PREVIOUS : (+) KEY
CANCEL : MENU KEY
  
```

• CN352/MS-39 (F-1)



4-196 (1800/1800P/1600/1600P)  
4-194 (1400/1400P/1200/1200P)

REEL POSITION

- IC152-1/DR

IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

A > 4 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC152/DR-214 (L-4)

REEL POSITION

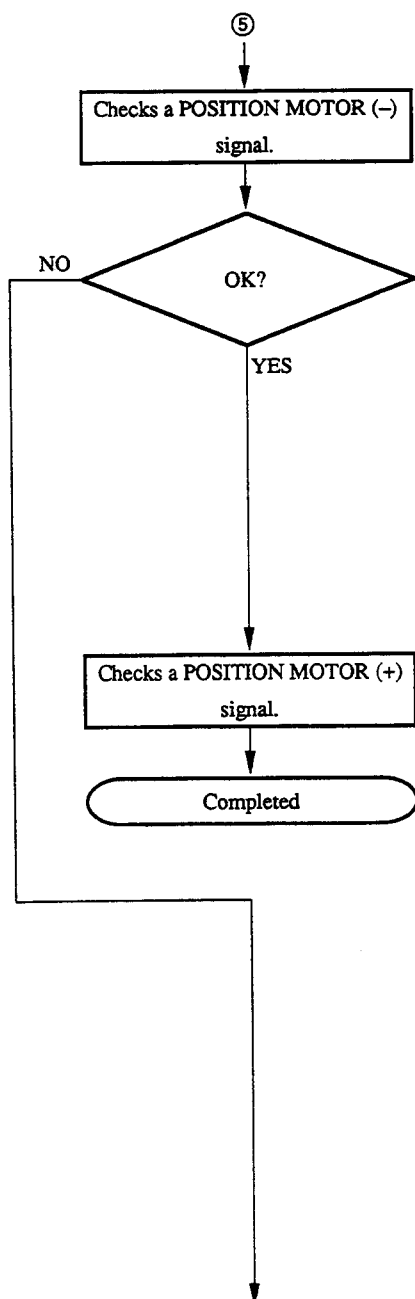
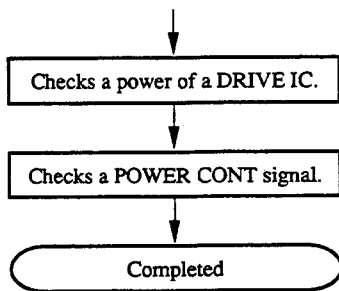
- IC152-2/DR

IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

A < 1 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC152/DR-214 (L-4)



REEL POSITION

• CN352-1/MS  
IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

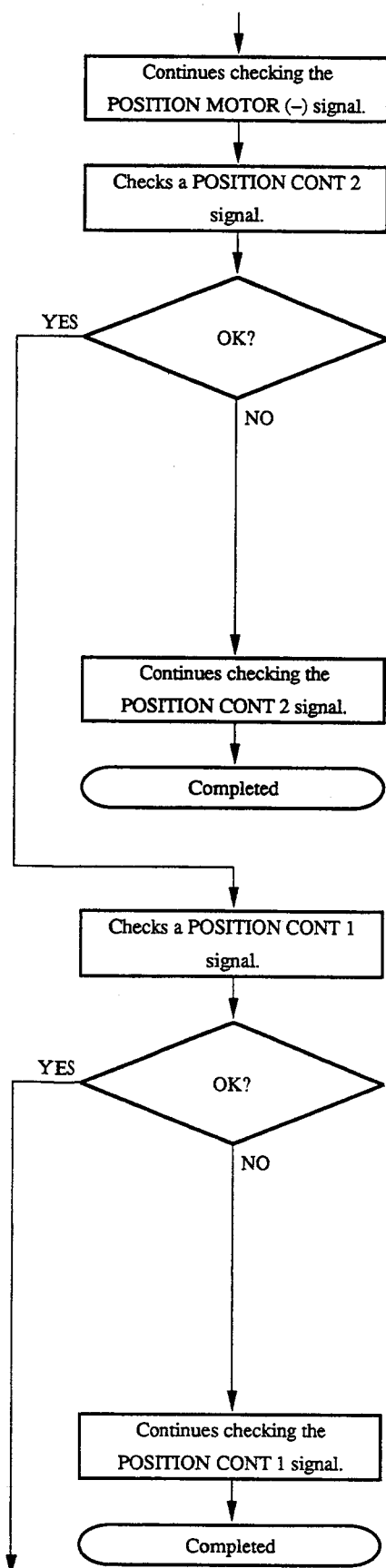
A > 10 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (-) KEY  
CANCEL : MENU KEY

• CN352/MS-39 (F-1)

Continues to the next page.

4-197 (1800/1800P/1600/1600P)  
4-195 (1400/1400P/1200/1200P)



REEL POSITION

• IC152-2/DR  
IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

A > 4 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• IC152/DR-214 (L-4)

REEL POSITION

• IC152-1/DR  
IS THE VOLTAGE VALUE <A>  
PERMISSIBLE LIMIT?

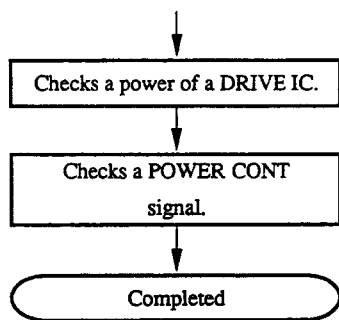
A < 1 V

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

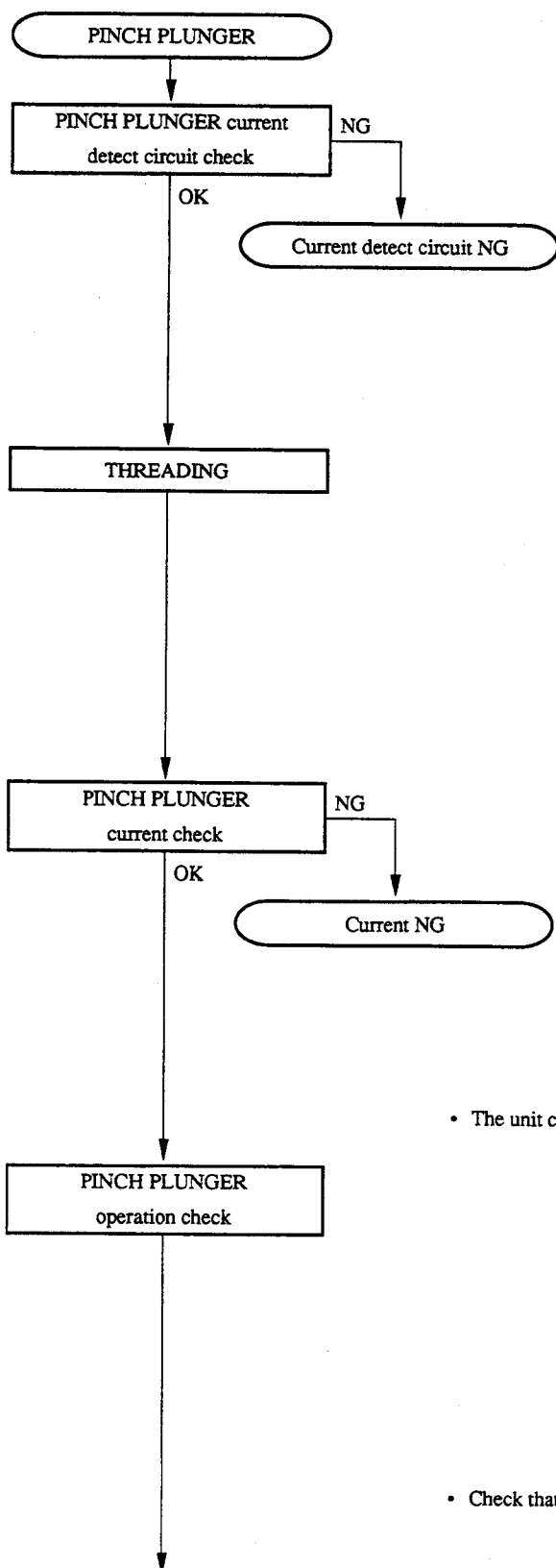
• IC152/DR-214 (L-4)

4-198 (1800/1800P/1600/1600P)  
4-196 (1400/1400P/1200/1200P)





# (14) PINCH PLUNGER Diagnosis



PINCH PLUNGER  
PINCH PLUNGER CURRENT  
NOW CHECKING ...  
  
CANCEL : MENU KEY

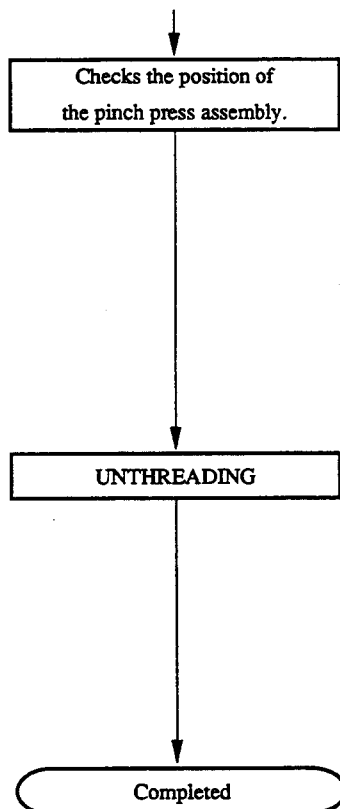
PINCH PLUNGER  
  
THREADING ...  
  
CANCEL : MENU KEY

PINCH PLUNGER  
PINCH PLUNGER CURRENT  
NOW CHECKING ...  
  
CANCEL : MENU KEY

- The unit checks automatically.

PINCH PLUNGER  
PINCH PLUNGER  
ACTIVATED?  
  
NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check that the pinch plunger is ON and against the capstan motor.



PINCH PLUNGER

PINCH PRESS ASSEMBLY

CHECK ITS POSITION.

NG : NO KEY

OK : YES KEY

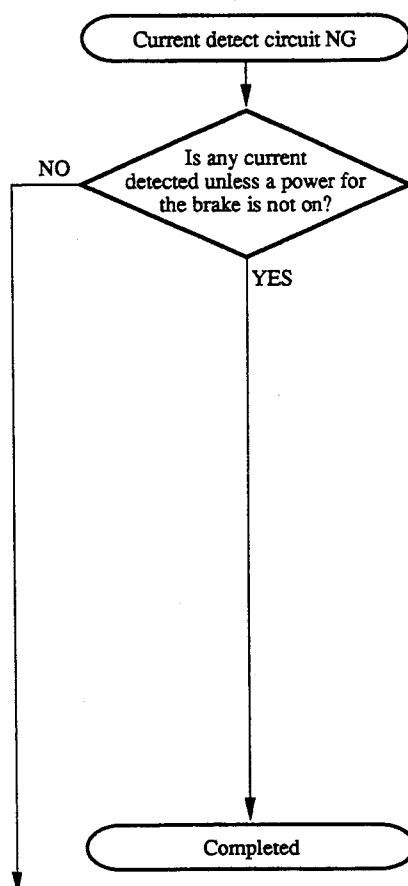
PREVIOUS : (←) KEY

CANCEL : MENU KEY

- Refer to section 6-17-1 in Service Manual Vol. 1.

PINCH PLUNGER

UNTHREADING ...



PINCH PLUNGER

PINCH PLUNGER CURRENT NO GOOD.

NEXT : (→) KEY

CANCEL : MENU KEY

PINCH PLUNGER

SOME OF FOLLOWING PARTS ARE DEFECTIVE.

1 DR BOARD

2 SS BOARD

3 CONNECTION(DR-SS)

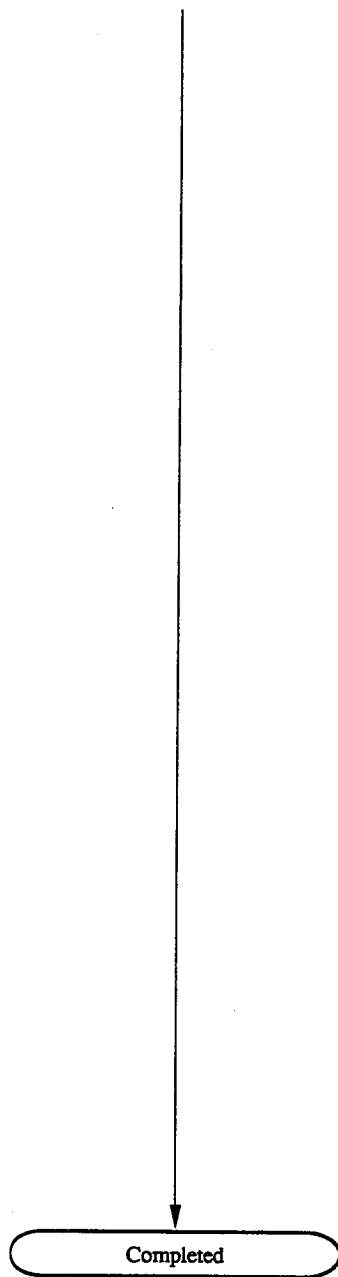
NEXT : (→) KEY

PREVIOUS : (←) KEY

CANCEL : MENU KEY

- The probable cause is that the current detect circuit is defective.

Continues to the next page.



PINCH PLUNGER  
PINCH PLUNGER CURRENT  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY

PINCH PLUNGER

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 MS BOARD  
2 DR BOARD  
3 RM-126 BOARD  
3 PD-35 BOARD  
CONTINUED...

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

PINCH PLUNGER

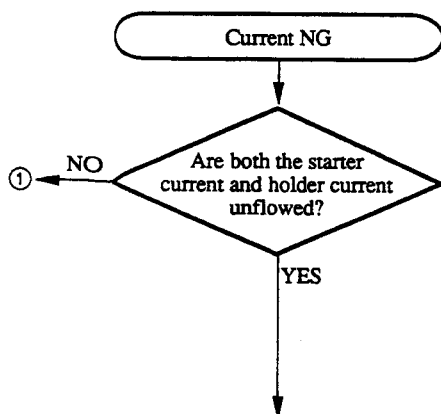
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

3 PINCH PLUNGER  
3 S-REEL BRAKE PLUNGER  
3 UNREG +12V LINE

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that any current is flowed by the cause such as a shorting of the signal line.

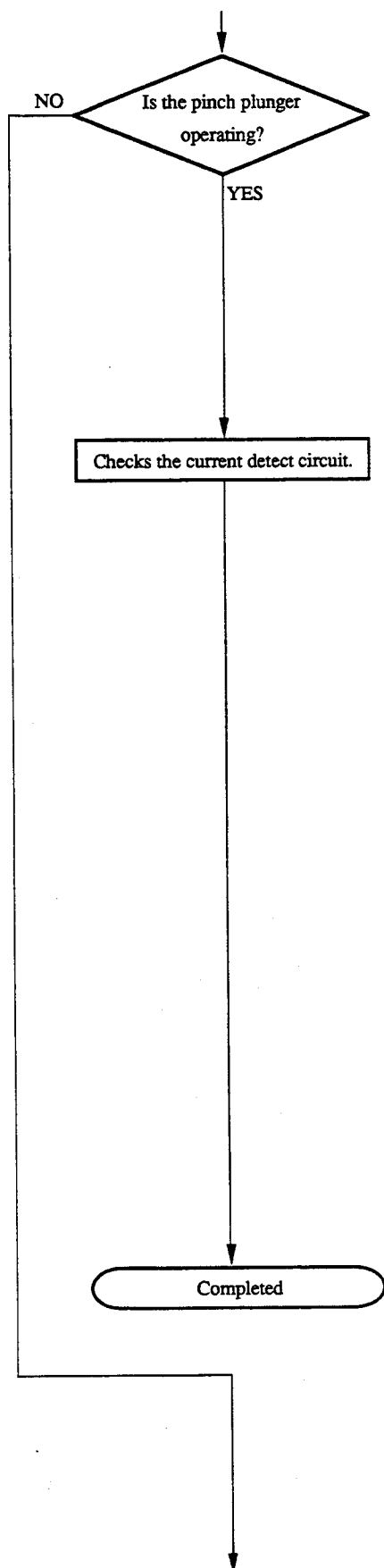
The other cause is that the S REEL BRAKE system is defective because the current detect circuit is used for both the PINCH PLUNGER and the S REEL BRAKE.



4-202 (1800/1800P/1600/1600P)  
4-200 (1400/1400P/1200/1200P)

PINCH PLUNGER  
PINCH PLUNGER CURRENT  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY



PINCH PLUNGER  
PINCH PLUNGER  
ACTIVATED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check that the pinch roller is against the capstan or not.

PINCH PLUNGER  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 CONNECTION(DR~SS).  
2 SS BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

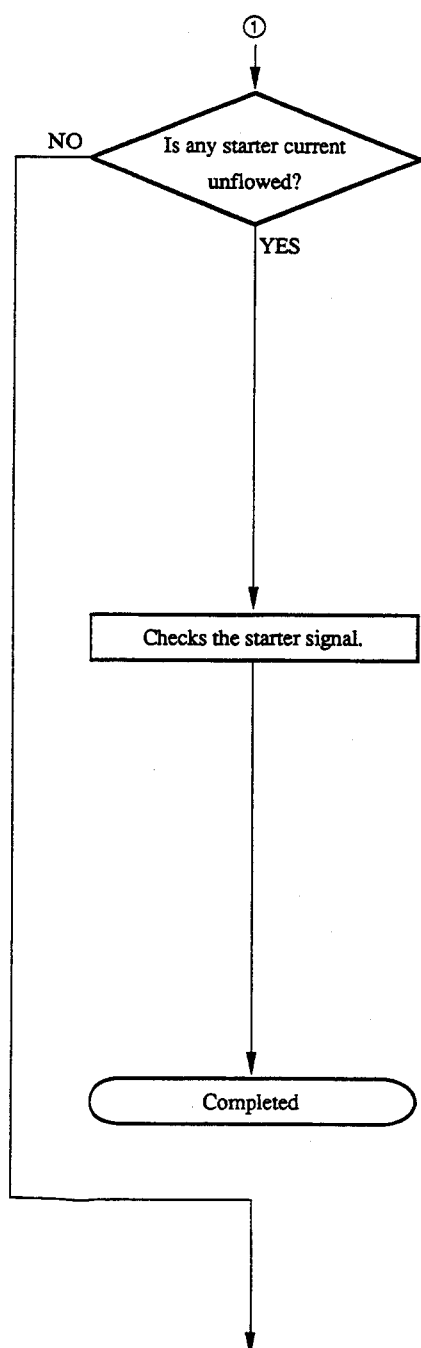
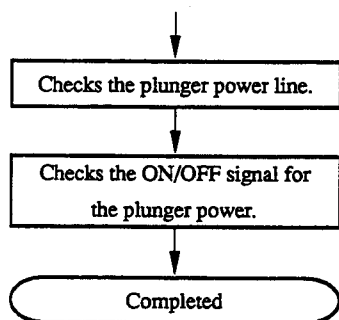
- The probable cause is the faulty connections of connectors or a break in the signal line on the SS board.

PINCH PLUNGER  
SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.  
1 DR BOARD  
2 SS BOARD  
3 MB BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- The probable cause is that the current detecting circuit on the DR board is defective or a SOL. CURRENT signal is shorted on the SS, MB or DR board.

Continues to the next page.



PINCH PLUNGER

PINCH STARTER CURRENT  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY

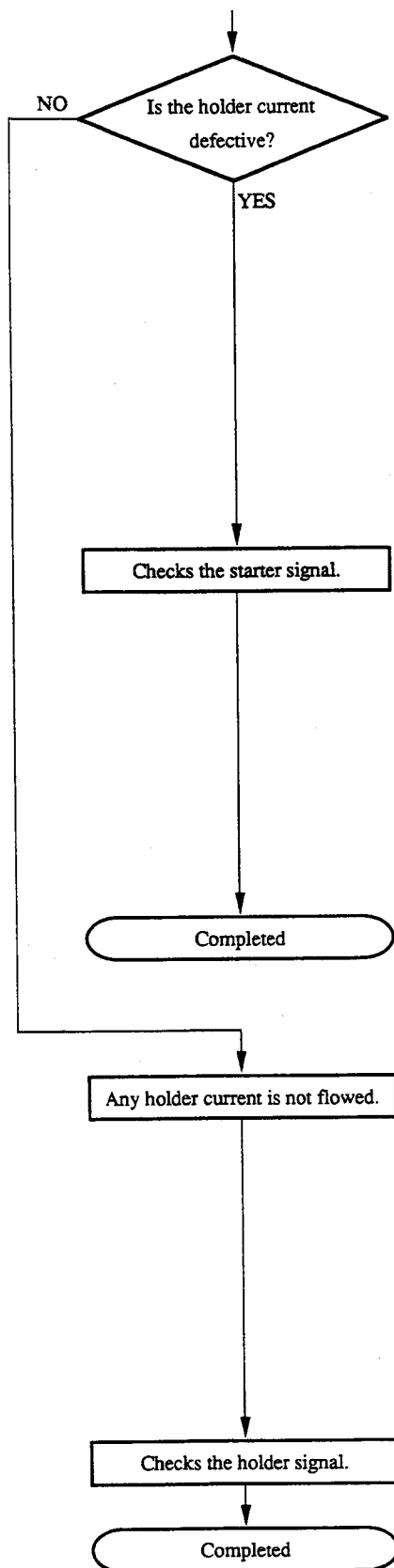
PINCH PLUNGER

• CN854-4/PD-35  
IS LOW PULSE DETECTED  
WHILE PRESSING (↑)KEY?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Check that about 300 msec pulse occurs every a second while pressing the (↑) key.
- Check that the voltage is more than 10 V while not pressing the (↑) key.

4-204 (1800/1800P/1600/1600P)  
4-202 (1400/1400P/1200/1200P)



PINCH PLUNGER

PINCH HOLDER CURRENT  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY

PINCH PLUNGER

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

1 MS BOARD  
2 PD-35 BOARD  
3 PINCH PLUNGER

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

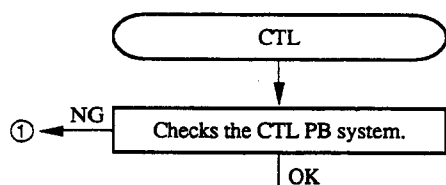
- The starter continues operating.

PINCH PLUNGER

PINCH HOLDER CURRENT  
NO GOOD.

NEXT : (→) KEY  
CANCEL : MENU KEY

(15) CTL Diagnosis



CTL

SET  
ALIGNMENT TAPE CR5-1B  
AND PUSH STOP KEY.

CANCEL : MENU KEY

CTL

CTL

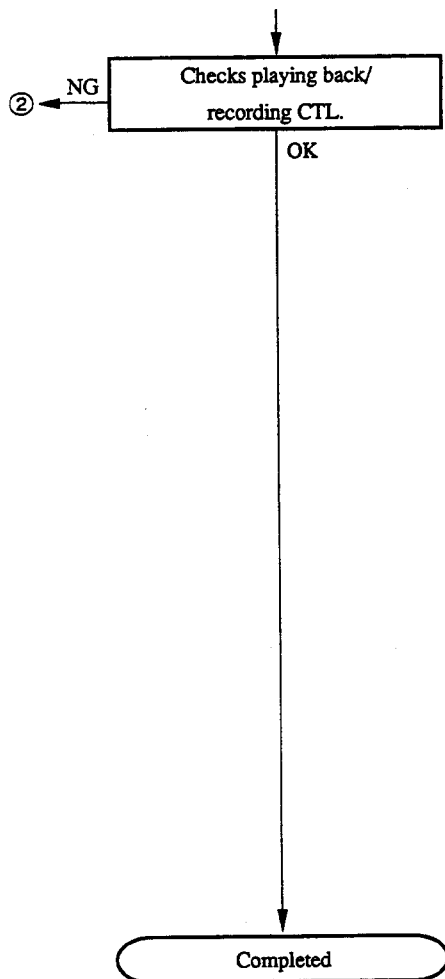
NOW CHECKING ...

CANCEL : MENU KEY

- Using a reference tape, the unit checks the CTL PB system automatically.

4-206 (1800/1800P/1600/1600P)  
4-204 (1400/1400P/1200/1200P)





CTL

SET A NEW METAL TAPE  
PULLED THE REC INHIBIT  
TAB UP  
AND PUSH STOP KEY.

CANCEL : MENU KEY

CTL

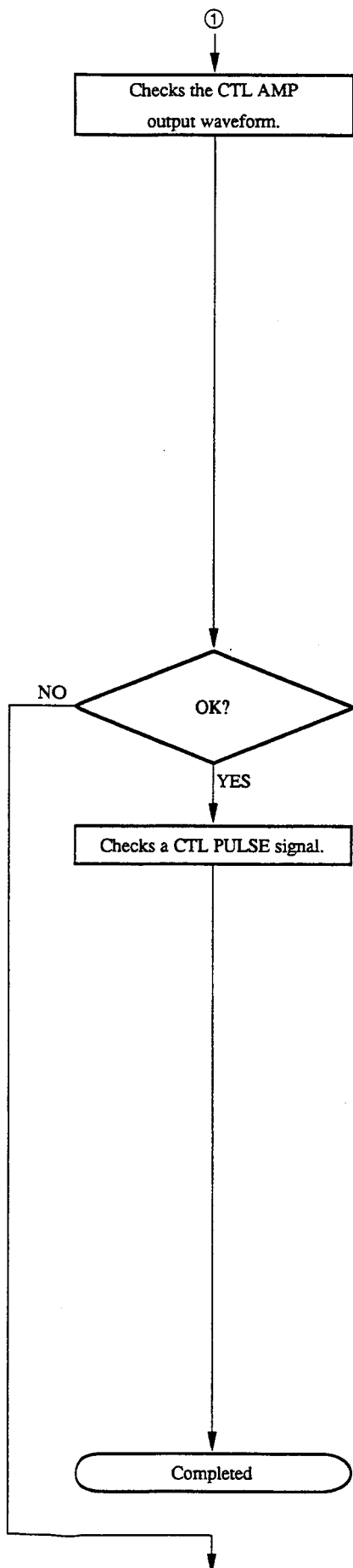
CTL

NOW CHECKING ...

CANCEL : MENU KEY

- Using a blank tape (no signal is recorded.), record a CTL signal. Then, play back the recorded portion.

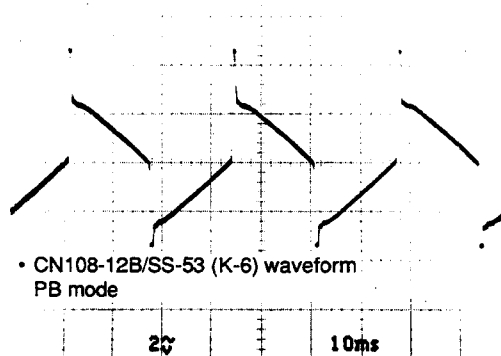
**Note :** If using the tape with recorded signals, the unit cannot decide whether the tape is recorded this time or not. Therefore, be sure to use a blank tape.



CTL

- CN108-12B/SS  
CHECK THE WAVE FORM ON THE POINT.

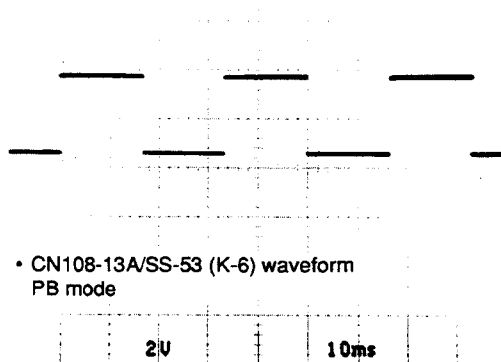
NG : NO KEY  
OK : YES KEY  
CANCEL : MENU KEY



CTL

- CN108-13A/SS  
CHECK THE WAVE FORM ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (+) KEY  
CANCEL : MENU KEY



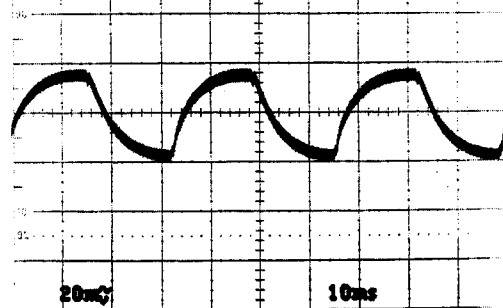
Checks the waveform of  
the CTL HEAD output signal.

CTL

- CN934-1/CTL  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

• CN934-1/CTL waveform  
PB mode



CTL

SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.

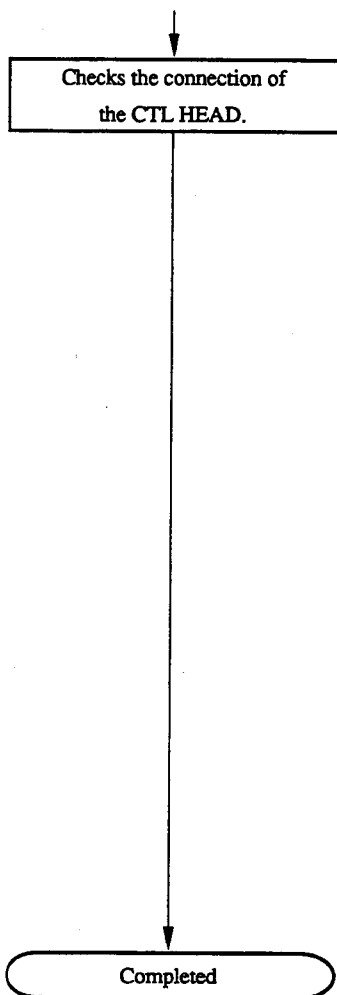
- 1 CTL HEAD
- 2 DR BOARD
- 2 MS BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Perform the CTL head adjustment and check with referring to sections 7-6 and 7-7 in Service Manual Vol. 1.

Continues to the next page.

4-209 (1800/1800P/1600/1600P)  
4-207 (1400/1400P/1200/1200P)



CTL

- CN302-17/DR  
~ CN934-1/CTL  
IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN302/DR-214 (H-5)

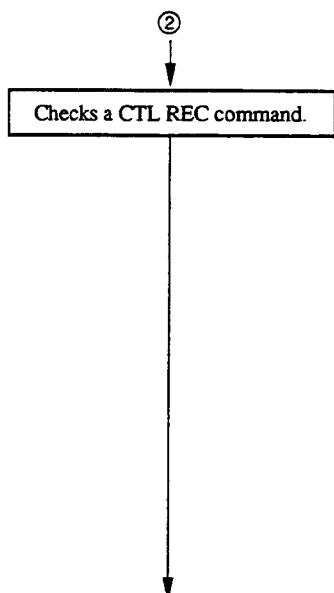
CTL

- CN302-16/DR  
~ CN934-2/CTL  
IS THE POINTS SHORTED?

NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- CN302/DR-214 (H-5)

- Stop the diagnosis and turn off the power. Then, check the connections by using a tester and so on.  
After checking, turn on the power and continue the diagnosis.



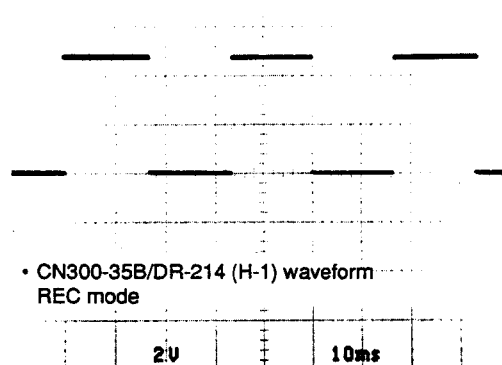
4-210 (1800/1800P/1600/1600P)  
4-208 (1400/1400P/1200/1200P)

Checks a REC CTL signal.

CTL

- CN300-35B/DR  
CHECK THE WAVE FORM  
ON THE POINT.

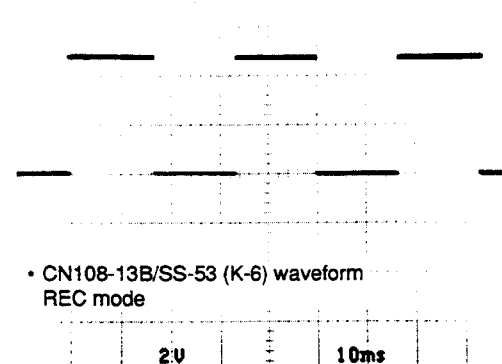
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



CTL

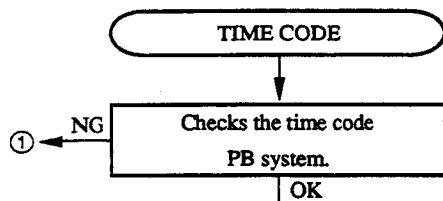
- CN108-13B/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



Completed

(16) TIME CODE Diagnosis



TIME CODE

SET  
ALIGNMENT TAPE CR5-1B  
AND PUSH STOP KEY.

CANCEL : MENU KEY

TIME CODE

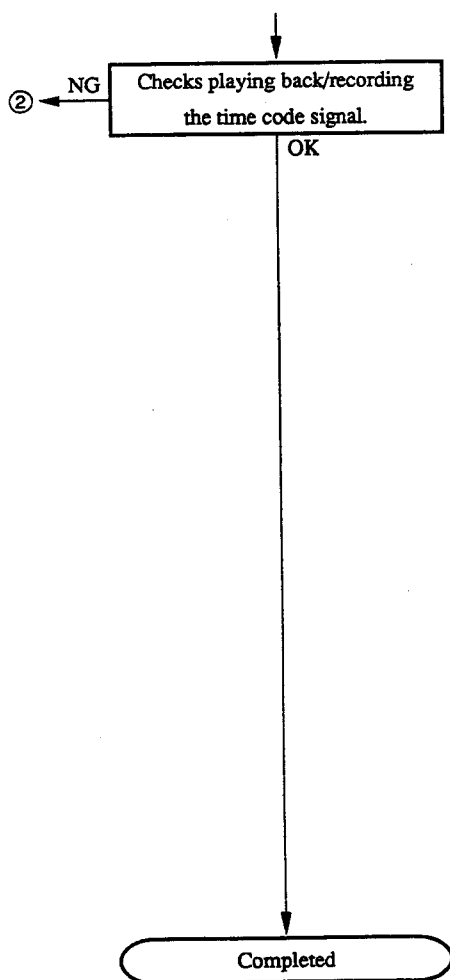
TIME CODE

NOW CHECKING ...

CANCEL : MENU KEY

- Using a reference tape, the unit checks the time code PB system automatically.

4-212 (1800/1800P/1600/1600P)  
4-210 (1400/1400P/1200/1200P)



```

TIME CODE
SET A NEW METAL TAPE
PULLED THE REC INHIBIT
TAB UP
AND PUSH STOP KEY.

o

CANCEL : MENU KEY
  
```

```

TIME CODE
TIME CODE
NOW CHECKING ...

CANCEL : MENU KEY
  
```

- Using a blank tape (no signal is recorded.), the unit automatically records a time code signal. Then, play back the recorded portion.

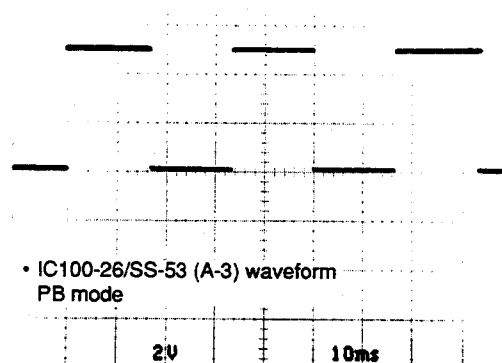
**Note :** If using the tape with recorded signals, the unit cannot decide whether the tape is recorded at this time or not. Therefore, be sure to use a blank tape.

①  
Checks a CTL PULSE signal.

TIME CODE

- IC100-26/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
CANCEL : MENU KEY

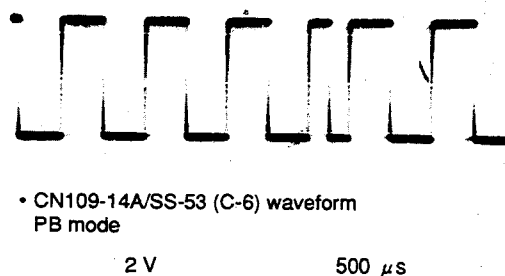


Checks a PB LTC signal.

TIME CODE

- CN109-14A/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



4-214 (1800/1800P/1600/1600P)  
4-212 (1400/1400P/1200/1200P)



Checks a TC HEAD input signal.

TIME CODE

- TC HEAD CONNECTOR-1/AP  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



• CN3-1/AP-31 (G-4) waveform  
PB mode

10 mV

500  $\mu$ s

TIME CODE

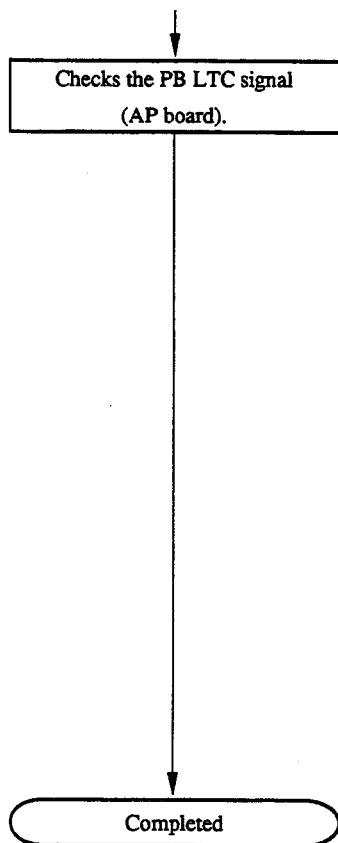
- SOME OF FOLLOWING PARTS  
ARE DEFECTIVE.
- 1 TC HEAD
  - 1 HARNESS (TC-AP)
  - 2 AP BOARD

NEXT : (→) KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

- Refer to sections 7-8 through 7-11 in Service Manual Vol. 1.

Continues to the next page.

4-215 (1800/1800P/1600/1600P)  
4-213 (1400/1400P/1200/1200P)



TIME CODE

- TP402/AP

CHECK THE WAVE FORM  
ON THE POINT.

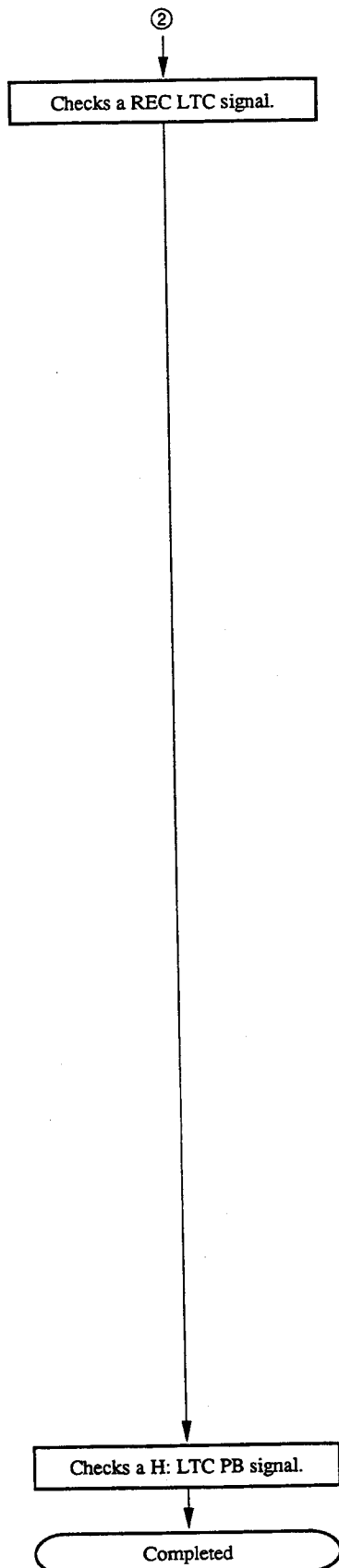
NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



• TP402/AP-31 (G-5) waveform  
PB mode

2 V

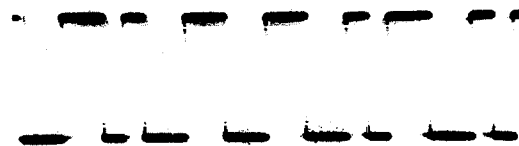
500  $\mu$ s



TIME CODE

- CN109-20A/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
CANCEL : MENU KEY



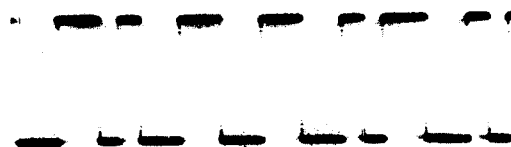
- CN109-20A/SS-53 (C-6) waveform  
REC mode

2 V                      500  $\mu$ s

TIME CODE

- CN112-23A/AR  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

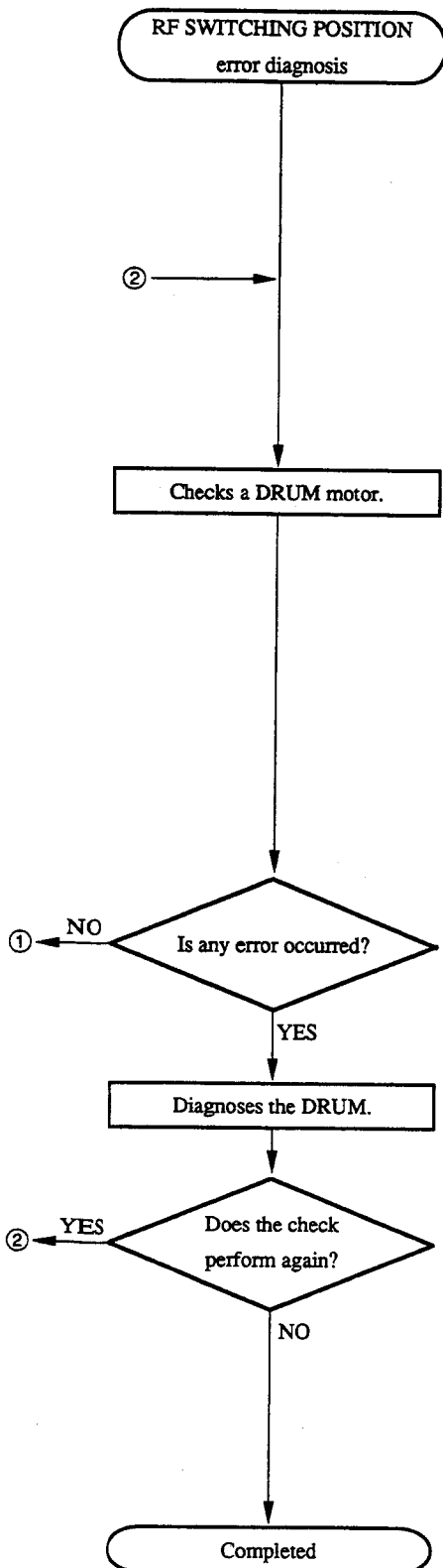


- CN112-23A/AR-14 (E-5) waveform  
REC mode

2 V                      500  $\mu$ s

# (17) SW POS NG

- SW POSITION is checked at WITH ALIGNMENT TAPE of AUTO CHECK in SERVO CHECK menu. When any error occurs at the SW POSITION menu, perform diagnosis as follows;



```

SERVO CHECK MODE
PLAY (RETRY)
WITH ALIGNMENT TAPE
RF SWITCHING POSITION
ERROR

NEXT : (→) KEY
CANCEL : MENU KEY
  
```

```

DRUM
DRUM
NOW CHECKING ...

CANCEL : MENU KEY
  
```

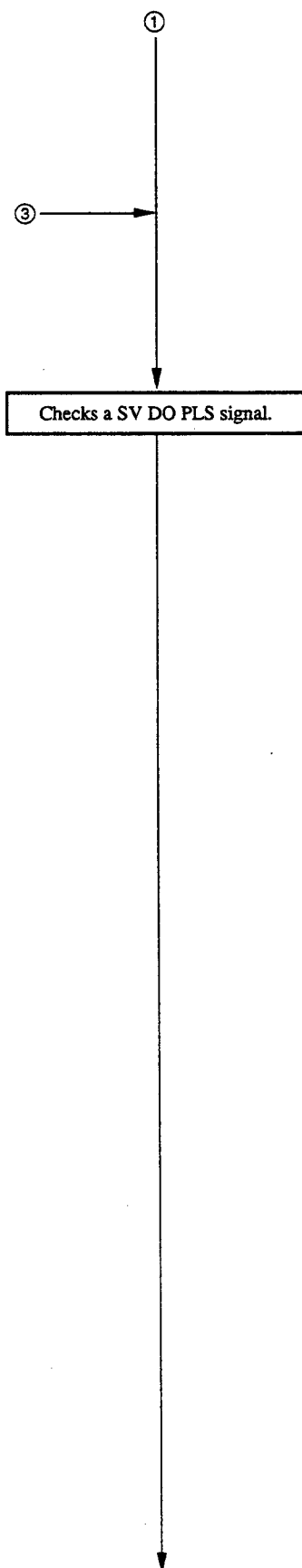
- For details, refer to the flowchart as shown in (12) DRUM Diagnosis.

- For details, refer to the flowchart as shown in (12) DRUM Diagnosis.

```

DRUM
DRUM
EXECUTE DIAG. AGAIN?

NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY
  
```



DRUM

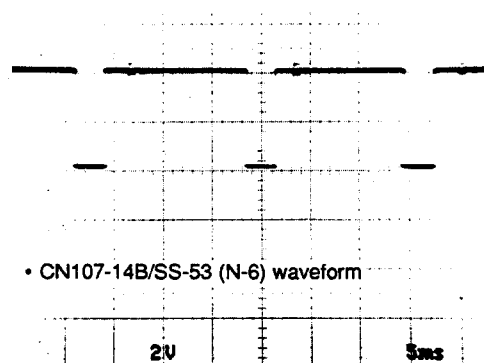
DRUM  
CHECK COMPLETED.

NEXT : (→) KEY  
PREVIOUS : (←) KEY

DRUM

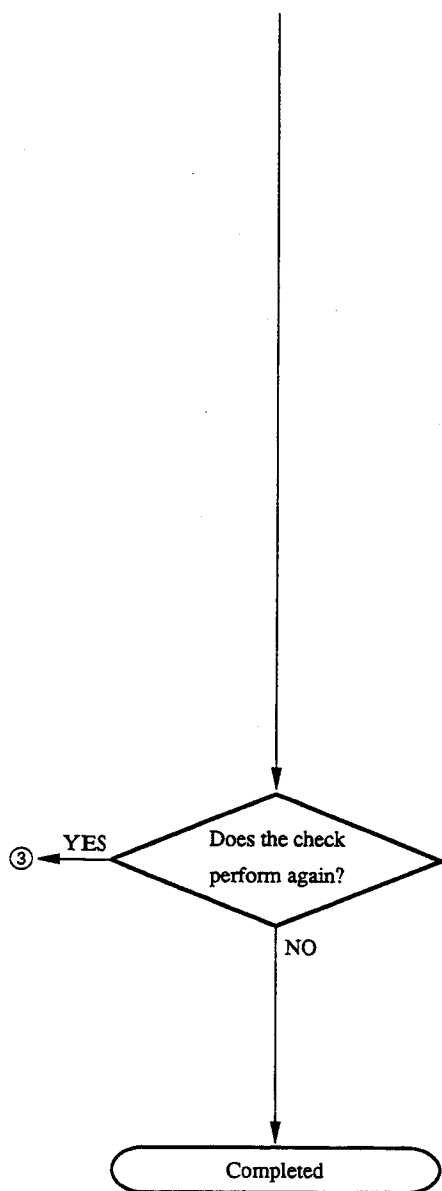
• CN107-14B/SS  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



Continues to the next page.

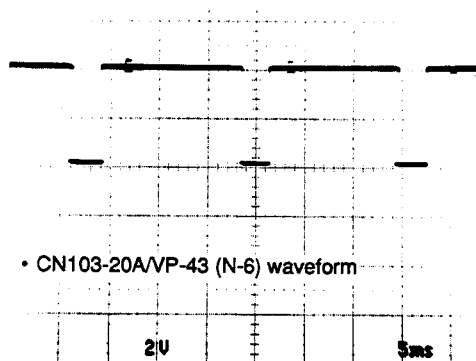
4-219 (1800/1800P/1600/1600P)  
4-217 (1400/1400P/1200/1200P)



DRUM

• CN103-20A/VP  
CHECK THE WAVE FORM  
ON THE POINT.

NG : NO KEY  
OK : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY



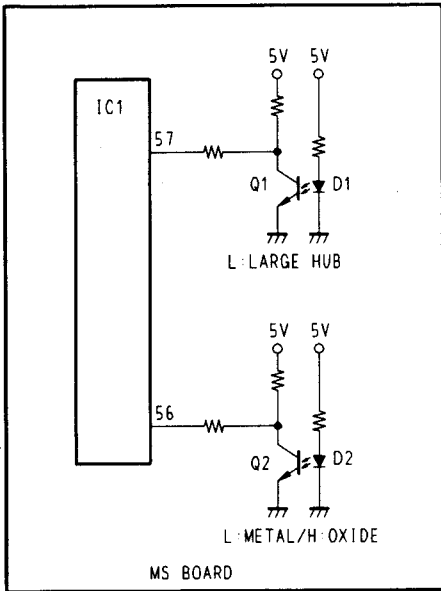
DRUM

DRUM  
EXECUTE DIAG. AGAIN?

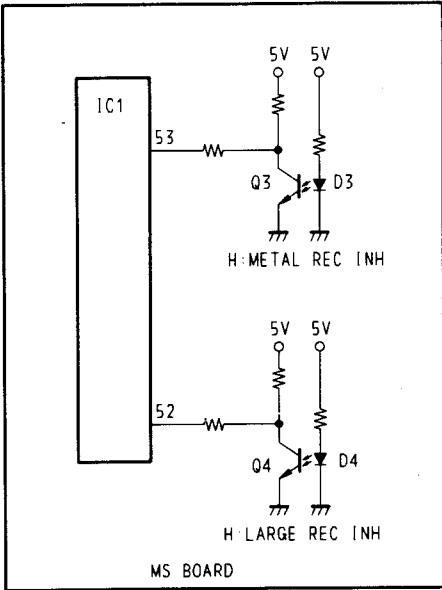
NO : NO KEY  
YES : YES KEY  
PREVIOUS : (←) KEY  
CANCEL : MENU KEY

BLOCK DIAGRAM

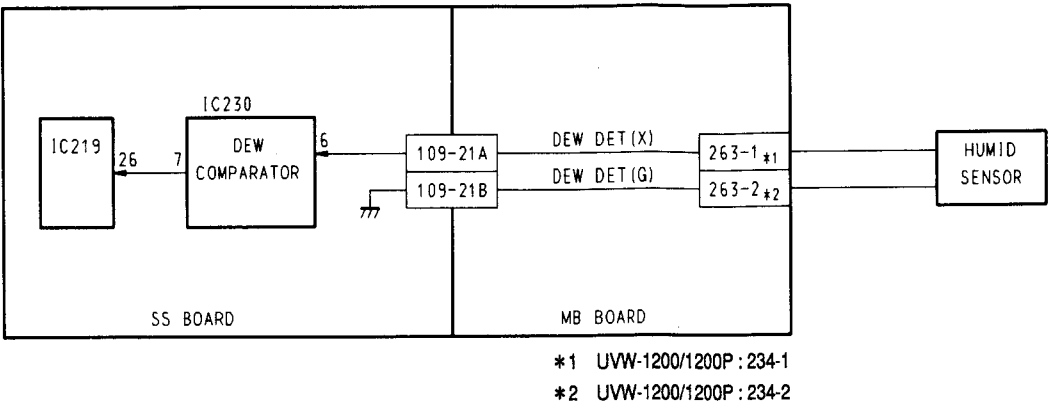
• CASSETTE ID



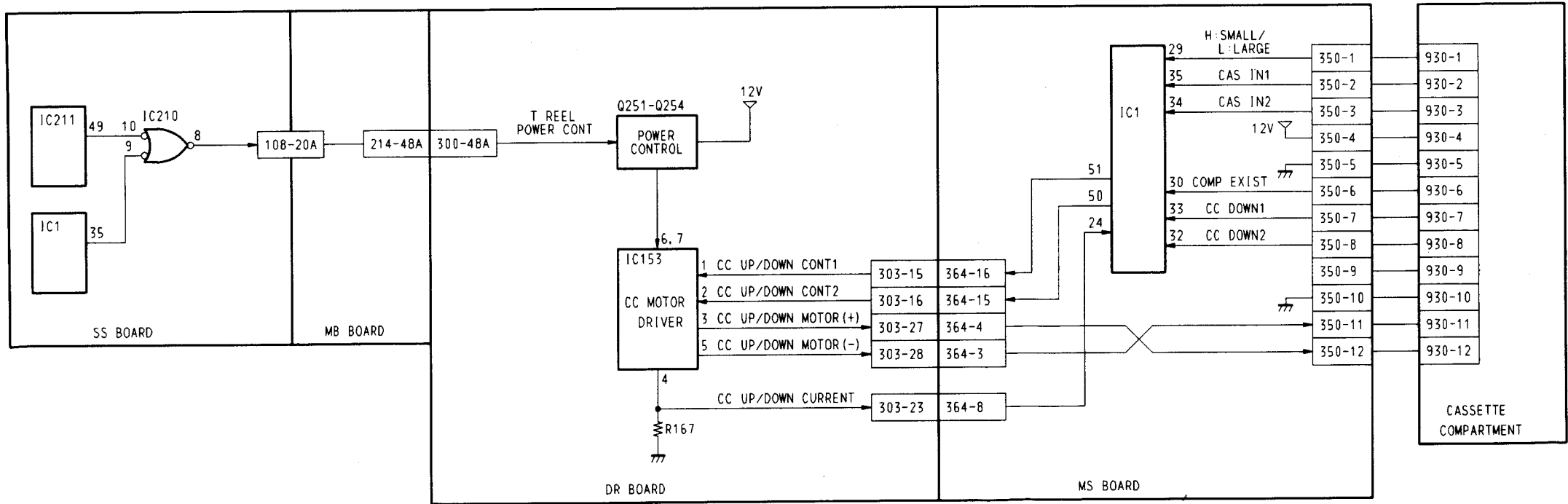
• REC INHIBIT



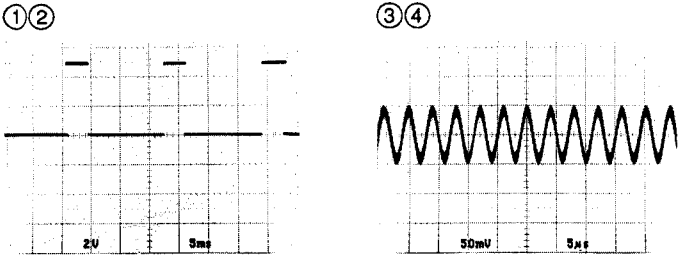
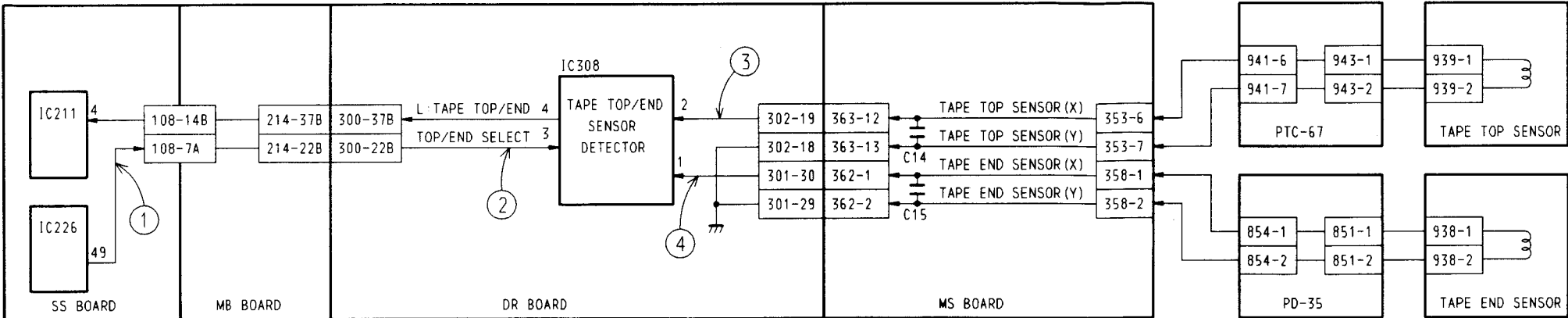
• HUMID SENSOR



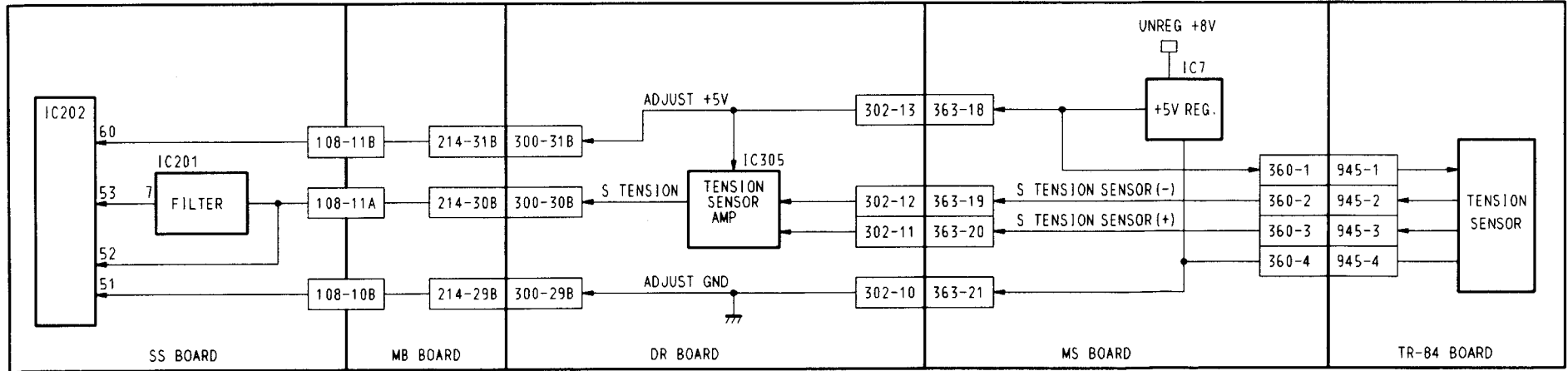
• CASSETTE COMPARTMENT



• TAPE TOP/END SENSOR

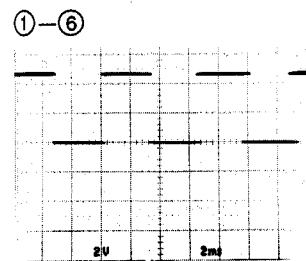
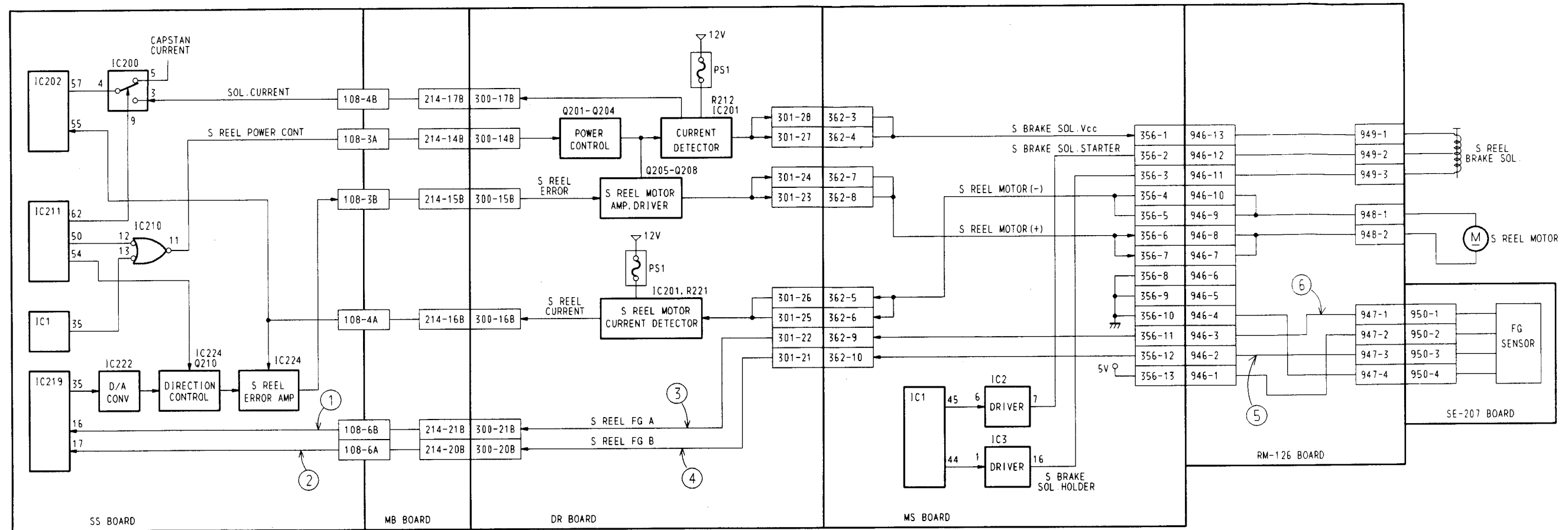


• TENSION SENSOR





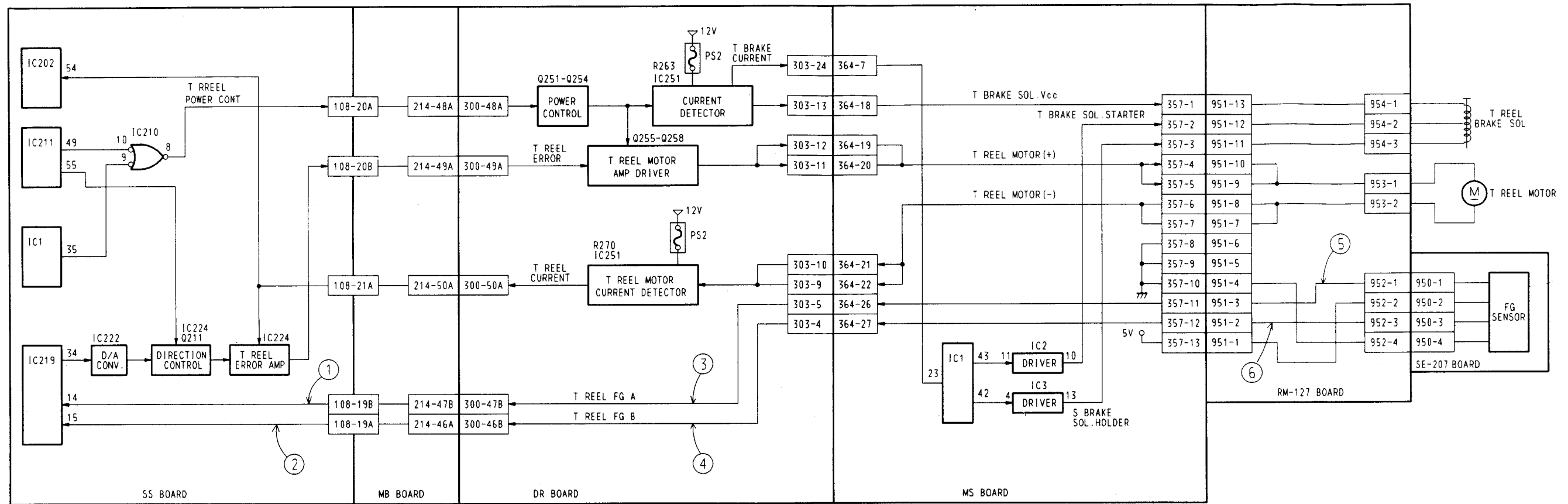
- S REEL



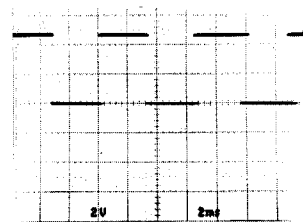
4-225 (1800/1800P/1600/1600P)  
4-223 (1400/1400P/1200/1200P)

4-225 (1800/1800P/1600/1600P)  
4-223 (1400/1400P/1200/1200P)

• T REEL



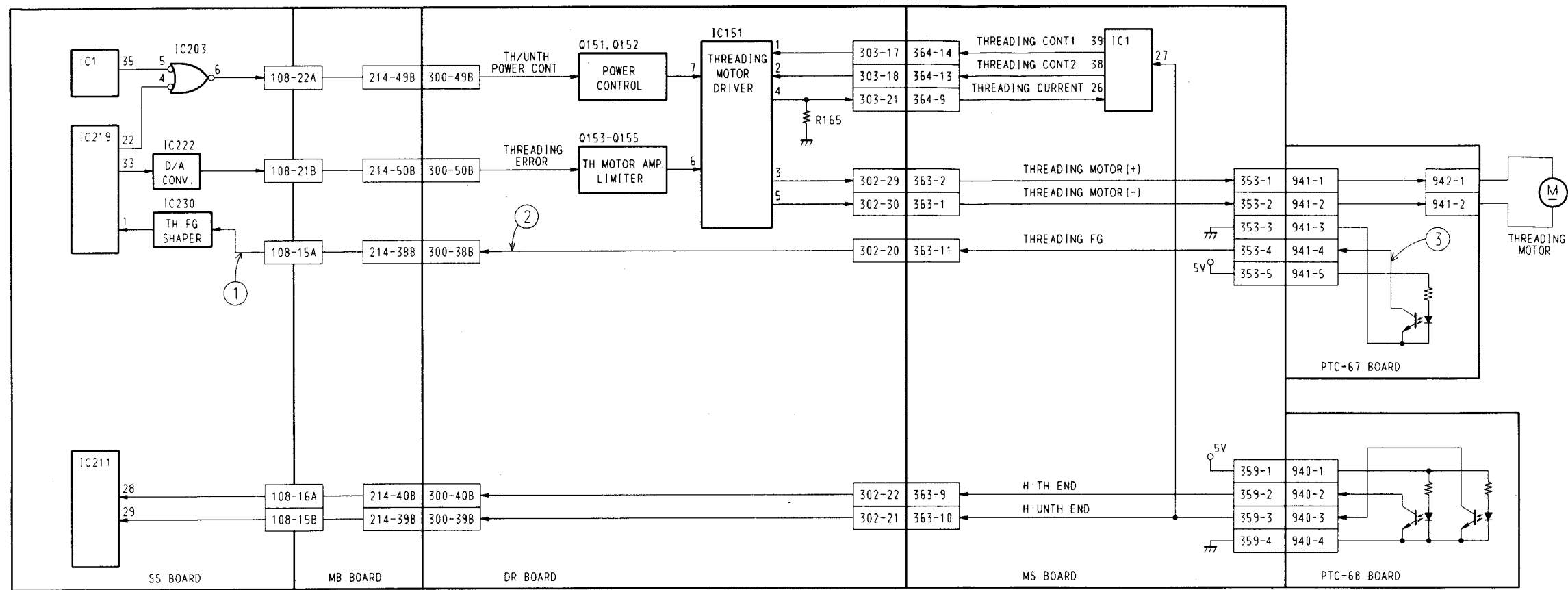
①—⑥



4-227 (1800/1800P/1600/1600P)  
4-225 (1400/1400P/1200/1200P)

4-227 (1800/1800P/1600/1600P)  
4-225 (1400/1400P/1200/1200P)

• THREADING



①-③

A1 1.2 V



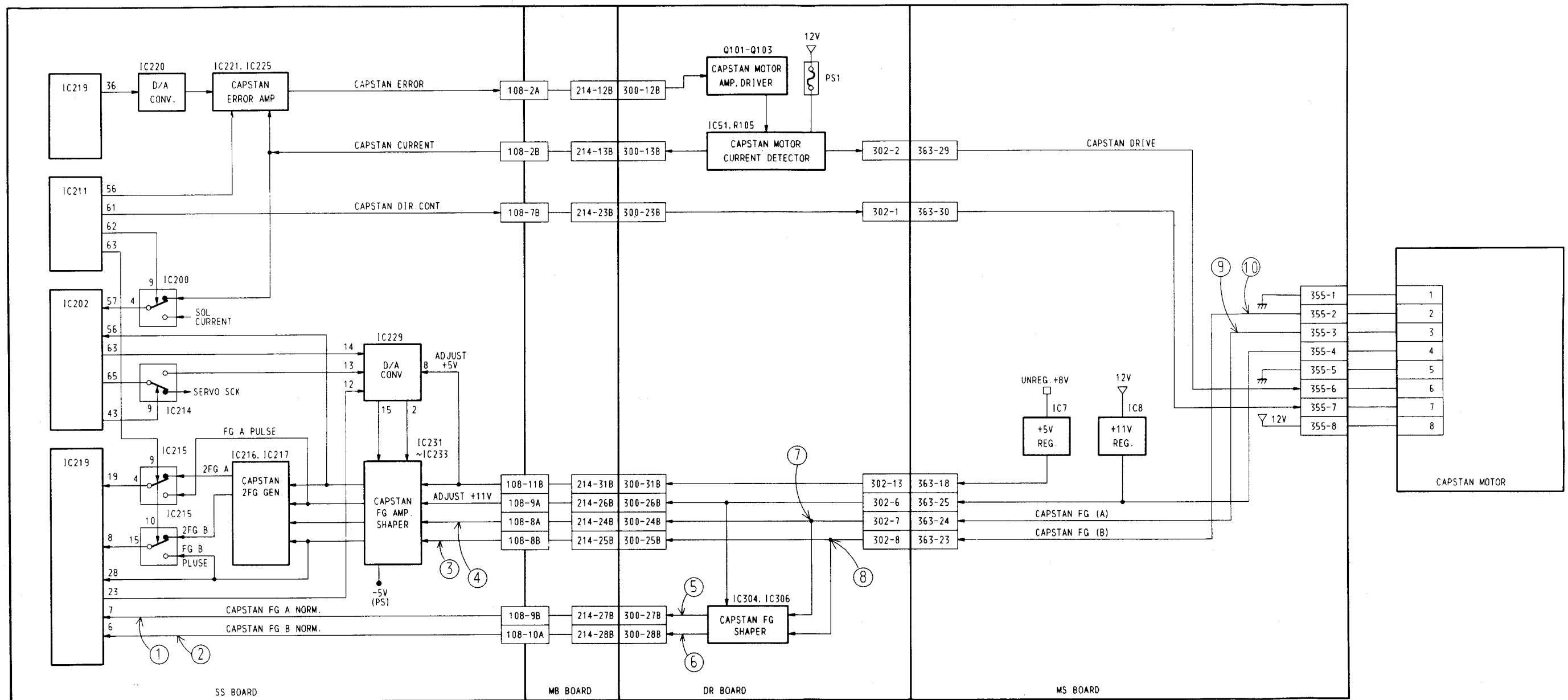
2V

1ms

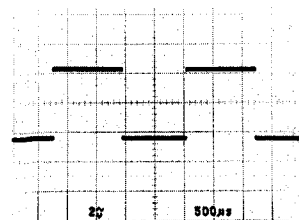
4-229 (1800/1800P/1600/1600P)  
4-227 (1400/1400P/1200/1200P)

4-229 (1800/1800P/1600/1600P)  
4-227 (1400/1400P/1200/1200P)

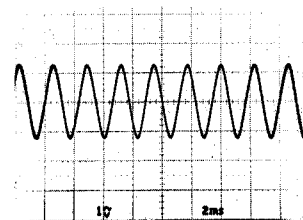
• CAPSTAN



①②⑤⑥



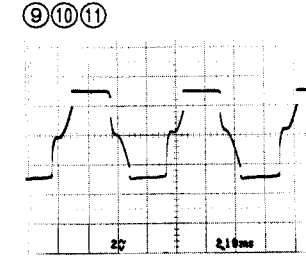
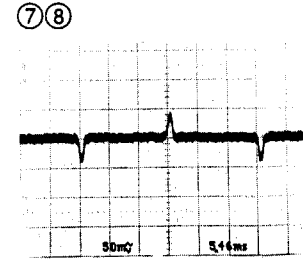
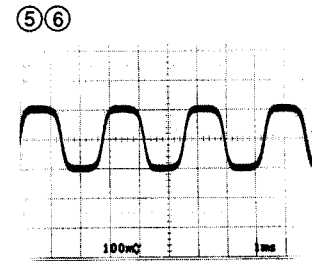
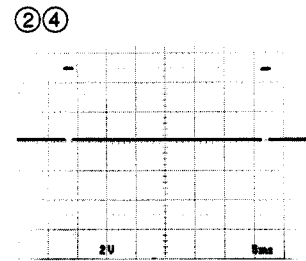
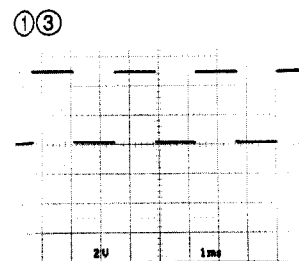
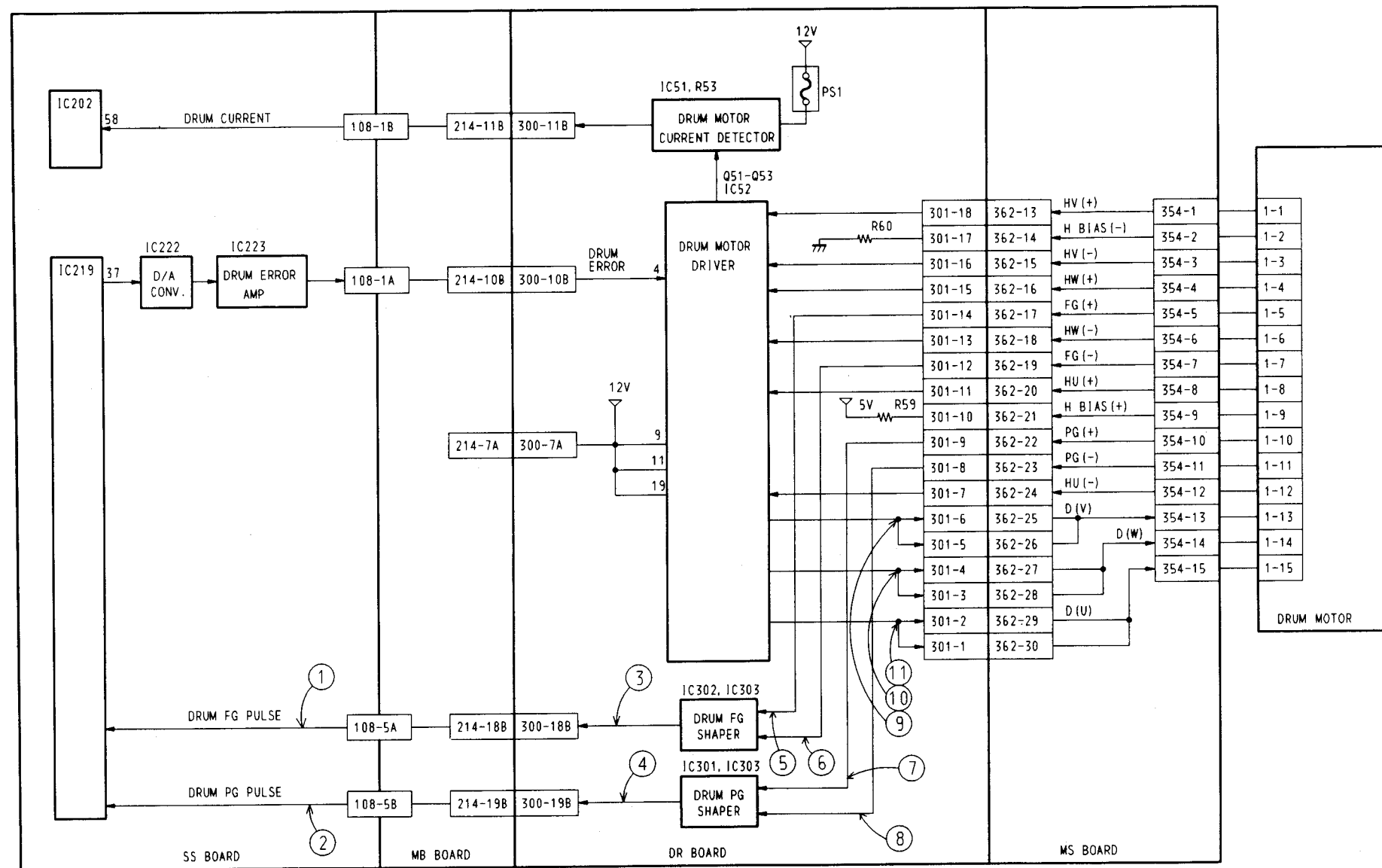
③④⑦⑧⑨⑩



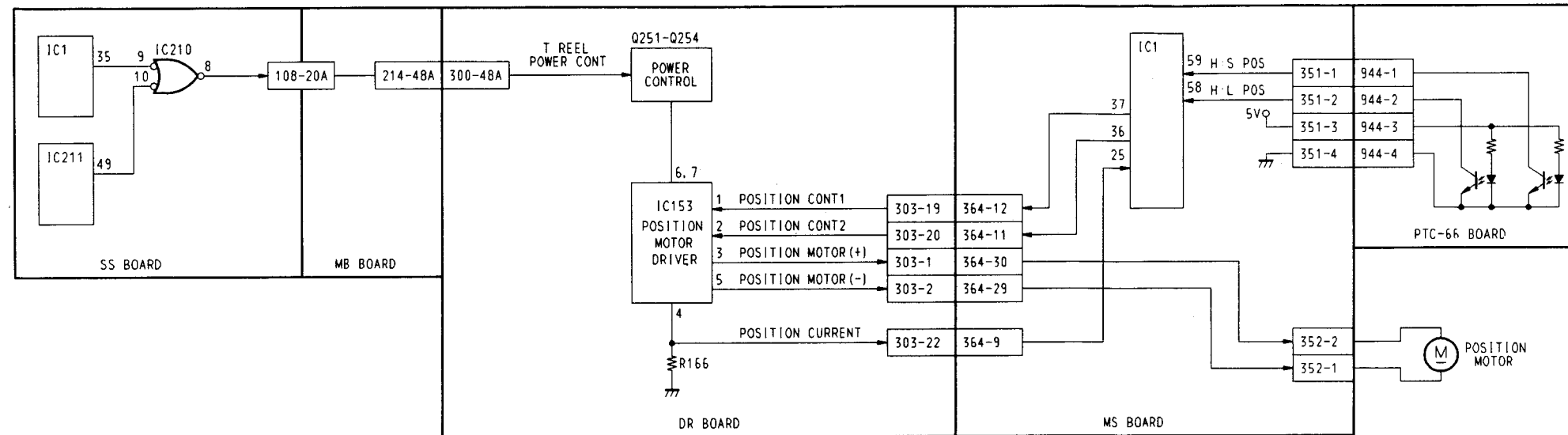
4-231 (1800/1800P/1600/1600P)  
4-229 (1400/1400P/1200/1200P)

4-231 (1800/1800P/1600/1600P)  
4-229 (1400/1400P/1200/1200P)

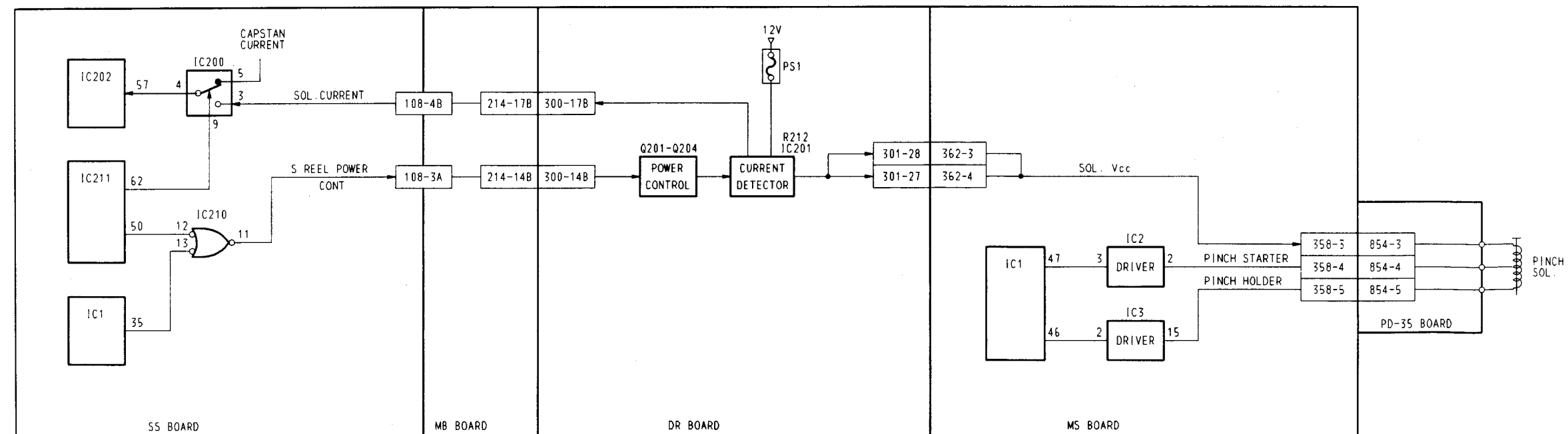
• DRUM



# • REEL POSITION



# • PINCH



4-235 (1800/1800P/1600/1600P)  
4-233 (1400/1400P/1200/1200P)

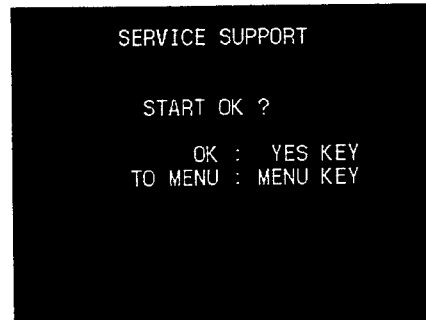
4-235 (1800/1800P/1600/1600P)  
4-233 (1400/1400P/1200/1200P)

### MANUAL EJECT

The operating method to take out the tape when the normal EJECT is impossible is displayed.

Select the SET (YES) key, and the "MANUAL EJECT" is entered.

Take out the tape according to the instruction on screen.

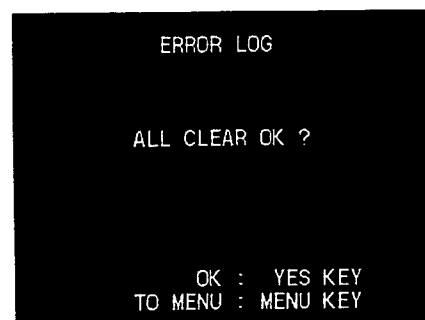


### DIAGNOSTICS CONTROL

This item has the function to delete the all ERROR LOG with memorized.



Press the YES key to delete the all ERROR LOG with memorized.  
To stop deleting, press the MENU key.

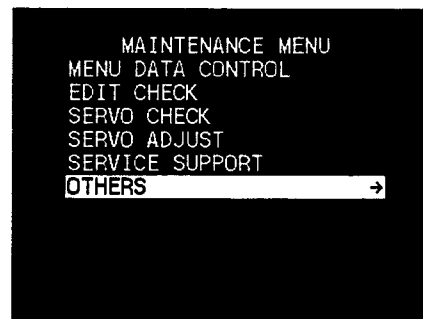


#### 4-7. OTHERS (1800/1800P/1600/1600P) 4-6. OTHERS (1400/1400P/1200/1200P)

In this item, it is able to check the SOFT version, CF data and display contents of memory, etc.

##### [Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVO ADJUST" on the monitor display using the (↑), (↓) keys.



Others

3. Press the (→) key.  
Then "SERVO ADJUST" is selected, and the menu of the lower level is displayed.



>Version

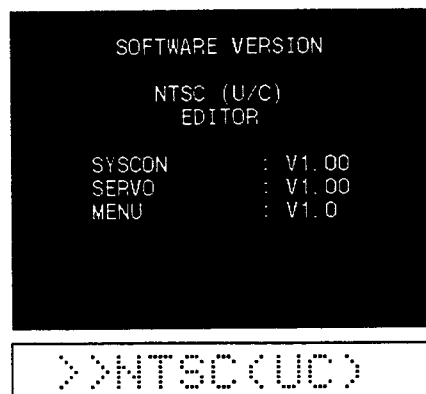
4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.  
Then the menus of the lower levels are displayed.
6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.  
(Refer to each page of item about a method of check.)
8. When check is finished, press the MENU key to return to the menu picture.
9. If there are other menus or sub menus wishing to be checked, repeat steps 4 to 8.
10. When closing the maintenance menu, press the MENU key.



## SOFTWARE VERSION

Press the (←) key or RESET key to return to the maintenance menu.

NTSC (U) : NTSC, For UC  
 { EDITOR : Recorder and player of EDIT/1800 )  
 { FEEDER : Player of EDIT/1600 )  
 { RECORDER : Recorder and player/1400 )  
 { PLAYER : Player/1200 )  
 SYSCON : Version of IC4 on the SS-53 board  
 SERVO : Version of IC212 on the SS-53 board  
 MENU : Version of initial setup menu



- \* The content of display on the time counter can be changed by pressing the (↑) and (↓) keys.
- Returns to the maintenance menu using the (←) key or RESET key.

## KEYBOARD CHECK

In this mode, it is able to check the key on the keyboard, slide switch and time counter.

1. Press the SET (YES) key, to enter into the KEYBOARD CHECK.

**Note :** Once a machine enters the KEYBOARD CHECK mode, it cannot exit without turning off the power.

2. The monitor displays settings of all switches on the sub control panel. All dots of the time counter light.

### KEYBOARD CHECK

VIDEO INPUT : Y-R,B  
DISPLAY SEL : CTL  
RMT/LOCAL : LOCAL  
CHARACTER : ON  
TC INPUT : INT  
AUDIO CH-1/2: 00,00

KEY INPUT :

>KY Check

### KEYBOARD CHECK

VIDEO INPUT : Y-R,B  
DISPLAY SEL : CTL  
RMT/LOCAL : LOCAL  
CHARACTER : ON  
TC INPUT : INT  
AUDIO CH-1/2: 00,00

KEY INPUT : REC

REC

3. If any key is pressed or switch setting is changed, the condition that all displays are lighting is canceled.

Information about the changed switch or the pressed key is displayed.

If two or more switches are pressed at the same time, "DOUBLE KEYIN" is displayed.

\* Turn OFF the power to stop this mode.

### KEYBOARD CHECK

VIDEO INPUT : COMPOSITE  
DISPLAY SEL : LTC  
RMT/LOCAL : REMOTE  
CHARACTER : ON  
TC INPUT : INT  
AUDIO CH-1/2: 00,00

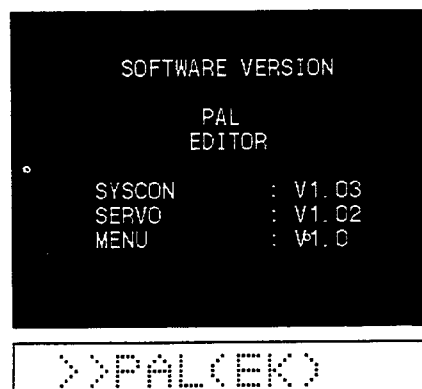
KEY INPUT : DOUBLE KEYIN

Double!!

## SOFTWARE VERSION

Press the (←) key or RESET key to return to the maintenance menu.

PAL : PAL, For EK  
{ EDITOR : Recorder and player of EDIT/1800P }  
{ FEEDER : Player of EDIT/1600P }  
{ RECORDER : Recorder and player/1400P }  
{ PLAYER : Player/1200P }  
SYSCON : Version of IC4 on the SS-53 board  
SERVO : Version of IC212 on the SS-53 board  
MENU : Version of initial setup menu



\* The content of display on the time counter can be changed by pressing the (↑) and (↓) keys.

Returns to the maintenance menu using the (←) key or RESET key.

## KEYBOARD CHECK

In this mode, it is able to check the key on the keyboard, slide switch and time counter.

1. Press the SET (YES) key, to enter into the KEYBOARD CHECK.

**Note :** Once a machine enters the KEYBOARD CHECK mode, it cannot exit without turning off the power.

2. The monitor displays settings of all switches on the sub control panel. All dots of the time counter light.

### KEYBOARD CHECK

VIDEO INPUT : Y-R, B  
DISPLAY SEL : CTL  
RMT/LOCAL : LOCAL  
CHARACTER : ON  
TC INPUT : INT  
AUDIO CH-1/2: 00,00

KEY INPUT :

>KY Check

### KEYBOARD CHECK

VIDEO INPUT : Y-R, B  
DISPLAY SEL : CTL  
RMT/LOCAL : LOCAL  
CHARACTER : ON  
TC INPUT : INT  
AUDIO CH-1/2: 00,00

KEY INPUT : REC

REC

3. If any key is pressed or switch setting is changed, the condition that all displays are lighting is canceled.

Information about the changed switch or the pressed key is displayed.

If two or more switches are pressed at the same time, "DOUBLE KEYIN" is displayed.

\* Turn OFF the power to stop this mode.

### KEYBOARD CHECK

VIDEO INPUT : COMPOSITE  
DISPLAY SEL : LTC  
RMT/LOCAL : REMOTE  
CHARACTER : ON  
TC INPUT : INT  
AUDIO CH-1/2: 00,00

KEY INPUT : DOUBLE KEYIN

Double!!

**[The symptoms which seem to be defective.]**

- ① Display function of the time counter is defective.
  - There is a segment which does not light even in the mode of all lamps lighting.
  - There is an abnormally bright or dark segment.
  - When any key is not pressed, no display is expected, but a segment is lighting.
- ② Key enter is defective.
  - Any key is not pressed, but a key name or "DOUBLE" is displayed.  
(When key setting is changed, the switch name is kept displayed. This is not trouble.)
  - A key is pressed, but the key name is not displayed.
- ③ Key illumination is defective.
  - A key is pressed, but the key is not illuminated.
  - Any key is not pressed, but a key is illuminated.
- ④ Switch input is defective.
  - A switch setting is changed, but the setting name is not displayed.

## CF DATA CHECK

In this mode video signal and CF data is displayed.  
Select the appropriate time counter item with the (↑), (↓) keys.

**CF data: 0, 1, 2, 3 (field)**

\* Due to the display timings, only the even fields are displayed.

- **DIFF OF REF** : Display of field number only is not enough for identification of relative phase relationship. The difference from the REF. VIDEO ID is displayed in ( ).

**REF VIDEO ID** : The CF field Number of REF video signal.

**INPUT VIDEO ID** : The CF field number of the input VIDEO signal.

The signals other than the composite signal has no CF information.

"0" is displayed.

When the input video signal is the composite signal, the STANDARD/ NONSTANDARD information of the input signal is also displayed.

(only on the monitor)

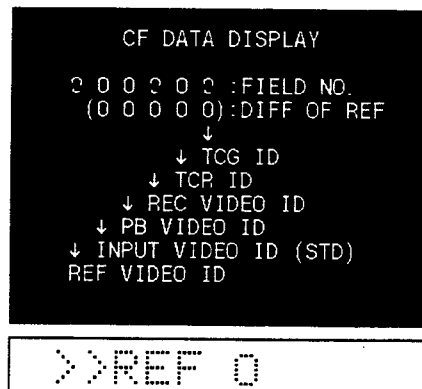
**PB VIDEO ID** : The signals other than the composite signal has no CF information.

In VIDEO EE mode, the CF field number of the input video signal is displayed.

**REC VIDEO ID** : The CF field number of the video signal to be recorded on tape during record mode.

**TCR VIDEO ID** : "0" is displayed. Playback TC signal.

**TCG ID** : The CF field number of the TC data generated by TC generator.



**MEMORY DISPLAY**

\* This menu is Factory use.





13. Keep pressing the Up/Down key until pointer of the tension measurement tool indicates  $45 \pm 3$  g.
14. When the adjustment is completed, press the right key.

```
SERVO ADJUST MODE

ADJUST TENSION
WITH (↑) OR (↓) KEY
IN RANGE OF  $45 \pm 3$ g.

NEXT : (→) KEY
CANCEL : MENU KEY
```

15. Keep pressing the Up/Down key until pointer of the tension measurement tool indicates  $25 \pm 3$  g.
16. When the adjustment is completed, press the right key.

```
SERVO ADJUST MODE

ADJUST TENSION
WITH (↑) OR (↓) KEY
IN RANGE OF  $25 \pm 3$ g.

NEXT : (→) KEY
CANCEL : MENU KEY
```

17. Confirm that pointer of the tension measurement tool indicates  $45 \pm 5$  g.
18. Press the right key to display the following screen.  
(Machine enters REV mode automatically.)

```
SERVO ADJUST MODE

CHECK TENSION
IN RANGE OF  $45 \pm 5$ g.

NEXT : (→) KEY
CANCEL : MENU KEY
```

19. Keep pressing the Up/Down key so that the REV back tension becomes  $30 \pm 3$  g.
20. Press the right key to display the following screen.

```
SERVO ADJUST MODE

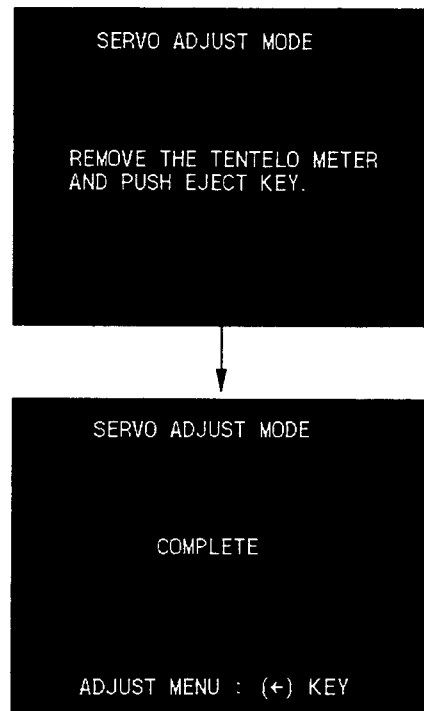
ADJUST TENSION
WITH (↑) OR (↓) KEY
IN RANGE OF  $30 \pm 3$ g.

NEXT : (→) KEY
CANCEL : MENU KEY
```

21. Remove the tension measurement tool paying utmost care not to contact with the drum.
22. Press the EJECT button to eject the cassette tape.

23. Confirm that "COMPLETE" is displayed on monitor screen.

When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".



### 6-37-1. Tension Sensor Magnet Position Adjustment

Mode : Threading end mode


#### Tools :

TR Arm Position Adjustment Tool Parallelism pin 3×12  
: 3-703-360-09  
Eccentric screw driver : 3-702-390-02  
or  
Flat head 3 mm screw driver : 7-700-750-01


#### Preparation :

Connect a video monitor to the VIDEO OUTPUT 2 connector to display the characters.

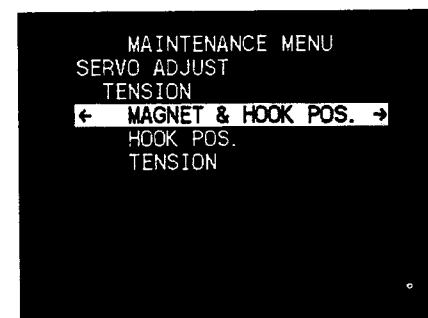
1. Remove the Cassette Up Compartment.
2. After power is turned ON, press the eject key.
3. Display the "MAINTENANCE MENU" on the monitor screen. (Refer to section 4.)
4. Select "SERVO ADJUST" from the menu by Up/Down key.
5. Press the right key to display the following screen.
6. Select "TENSION" from the servo adjustment menu by Up/Down key
7. Press the right key to display the following screen.
8. Select "MAGNET & HOOK POS." from the Tension Servo Adjustment menu by Up/Down key.
9. Press the right key to display the following screen.



```
MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST →
SERVICE SUPPORT
OTHERS
```



```
MAINTENANCE MENU
SERVO ADJUST
S/T-PEEL & CAPSTAN
S-PEEL ONLY
T-PEEL ONLY
CAPSTAN ONLY
← TENSION →
RF SWITCHING POSITION
PICTURE SPLITTING
SAVE/LOAD CONTROL
```



```
MAINTENANCE MENU
SERVO ADJUST
TENSION
← MAGNET & HOOK POS. →
HOOK POS.
TENSION
```

10. When preparation is ready, press YES key to start the adjustment.

```

SERVO ADJUST MODE

START OK ?

NO KEY : RETURN TO MENU
YES KEY : ADJUST START
  
```

```

SERVO ADJUST MODE

PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-37).

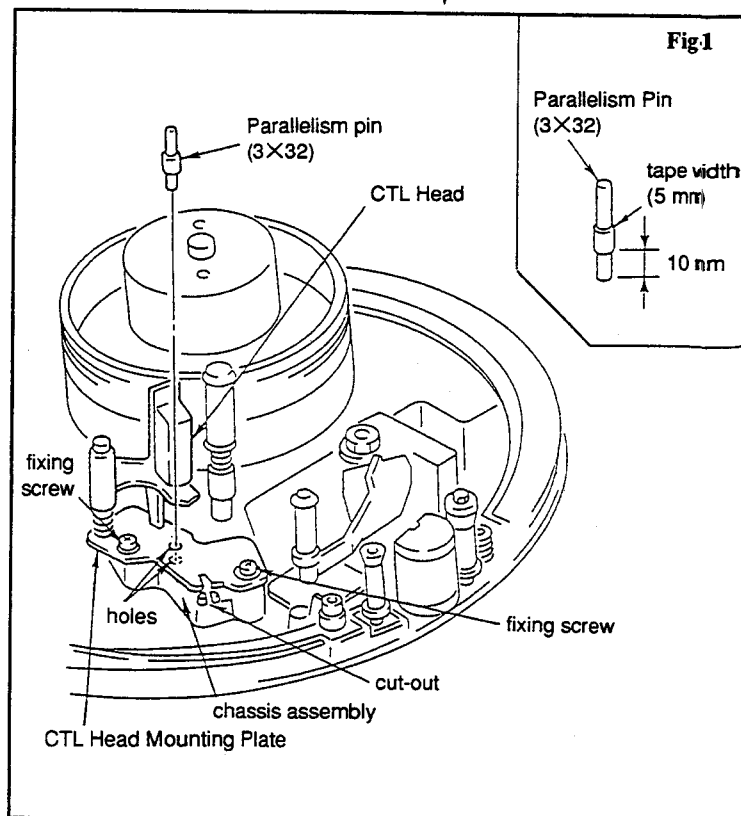
SET THE PIN ( 3mm ).

NEXT : (→) KEY
CANCEL : MENU KEY
  
```

#### Adjustment after replacement

11. Wrap a 5 mm width vinyl tape 1 to 2 turns around the Parallelism Pin at the position of 10 mm from its end. (Refer to Fig-1)
12. Loosen the two fixing screws 1/2 to 1 turn holding the CTL Head Assembly.
13. Insert a flat (head) screw driver tip into the cut-out of the CTL Head Mounting Plate. Adjust the position so that the hole of the CTL Head Mounting Plate and the hole of the chassis are aligned.
14. Insert Parallelism Pin setting the TR Arm Position passing through the hole of the CTL Head Mounting Plate and the hole of the chassis.

**Note :** When moving the CTL head, be sure to perform the CTL Head Position Check/Adjustment. (Refer to section 7-7.)



## 7-6. CTL HEAD HEIGHT CHECK/ADJUSTMENT

### Tools :

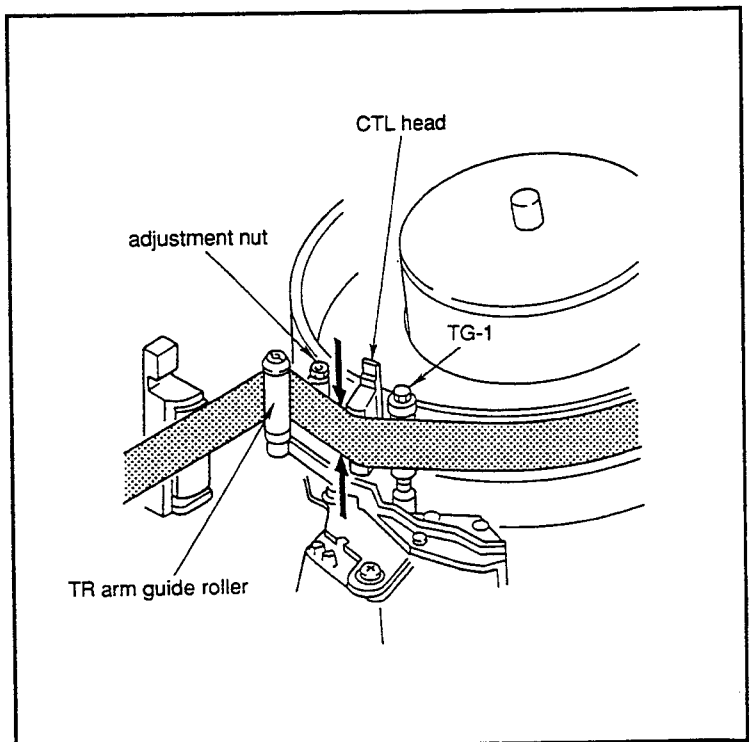
- Alignment tape CR8-1A : 8-960-097-45
- Dual trace oscilloscope
- Box driver (diagonal length 4.5 mm)

### Check procedure

1. Connect an oscilloscope.  
CH-1 : TP225/SS-53 board (C-1)
2. Set the switches on SS-53 board S201-1 and -5 to on.
3. Playback the 1 kHz recorded segment 1 kHz, 0 VU (8:00 to 10:00) on the CTL track of the alignment tape CR8-1A.
4. Press the tape (between the CTL head and TR arm guide roller) as shown with finger, and check that the RF signal level decreases.

### Adjustment procedure

5. In the case that the signal level increases when the tape is pushed up, turn the adjustment nut as shown in clockwise for the maximum output.
6. In the case that the signal level increases when the tape is pressed down, turn the adjustment nut as shown in counter-clockwise for the maximum output.
7. Set the switches on SS-53 board S201-1 and -5 to off.



## 7-7. CTL HEAD POSITION CHECK/ADJUSTMENT

### Tools :

Alignment tape CR2-1B : 8-960-096-01  
Dual trace oscilloscope  
-3 mm screw driver

### Check procedure

1. Connect an oscilloscope.  
CH-1 : TP101/VP-43, VP-43A board (L-2)  
CH-2 : TP102/VP-43, VP-43A board (P-1)  
TRIG : CH-2  
\* UVW-1400/1200 : VP-44, VP-44A
2. Playback the alignment tape CR2-1B.
3. Running the tape in play mode, press the RESET button on the sub control panel to set the tape path in the center position.
4. Press the Left and Right keys on the sub control panel which shift the tape path. Check that the RF signal amplitude decreases when the tape path of off tracking. (Refer to Fig-1.)
5. Press the RESET (NO) button on the sub control panel. Check that the center of the RF envelope has the maximum amplitude. (Refer to Fig-2.)
6. If the requirements in steps 4 and 5 are not satisfied, perform the next adjustment.

### Adjustment procedure

7. Loosen the two screws fixing the CTL head ass'y about 1/2 turn. Insert -3 mm screw driver tip into the cut-out of the base. Move the CTL head in the direction shown by arrow to obtain the maximum amplitude at the center of the RF envelope. (Refer to Fig-3.)

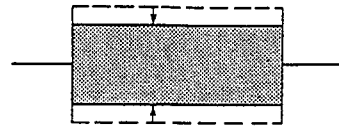


Fig-1.

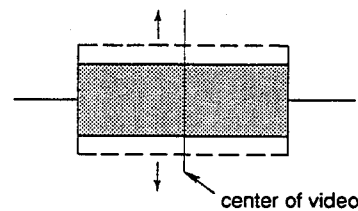


Fig-2.

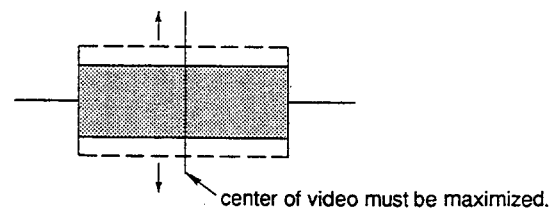
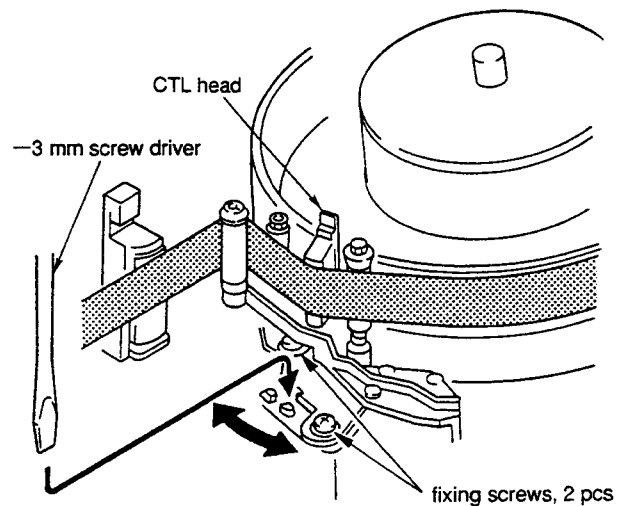


Fig-3.

## 7-6. CTL HEAD HEIGHT CHECK/ADJUSTMENT

### Tools :

Alignment tape CR8-1B PS : 8-960-096-86

Dual trace oscilloscope

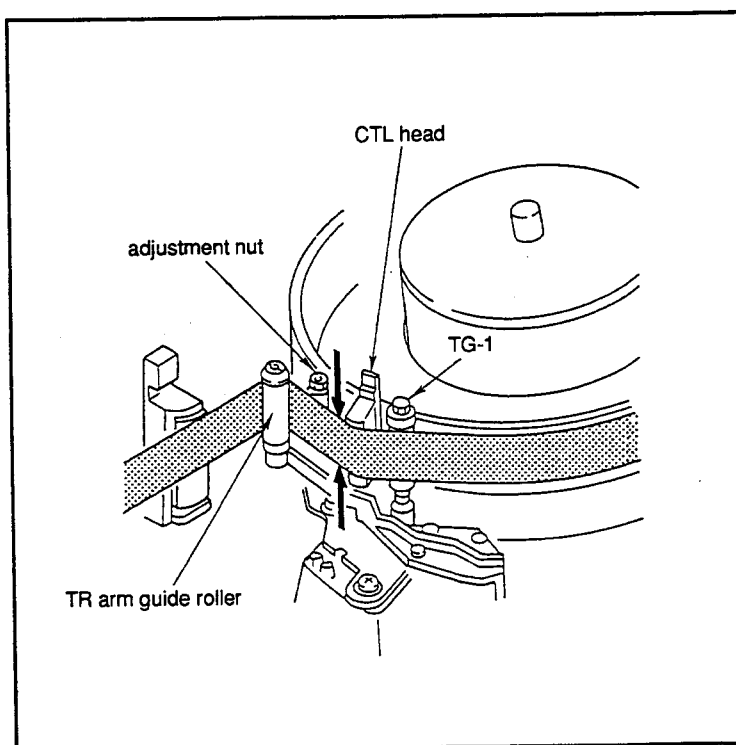
Box driver (diagonal length 4.5 mm)

### Check procedure

1. Connect an oscilloscope.  
CH-1 : TP225/SS-53 board (C-1)
2. Set the switches on SS-53 board S201-1 and -5 to on.
3. Playback the 1 kHz recorded segment 1 kHz, 0 VU (8:00 to 10:00) on the CTL track of the alignment tape CR8-1B PS.
4. Press the tape (between the CTL head and TR arm guide roller) as shown with finger, and check that the RF signal level decreases.

### Adjustment procedure

5. In the case that the signal level increases when the tape is pushed up, turn the adjustment nut as shown in clockwise for the maximum output.
6. In the case that the signal level increases when the tape is pressed down, turn the adjustment nut as shown in counter-clockwise for the maximum output.
7. Set the switches on SS-53 board S201-1 and -5 to off.



## 7-7. CTL HEAD POSITION CHECK/ADJUSTMENT

### Tools :

Alignment tape CR2-1B PS : 8-960-096-51  
Dual trace oscilloscope  
-3 mm screw driver

### Check procedure

1. Connect an oscilloscope.  
CH-1 : TP101/VP-43P, VP-43AP board (L-2)  
CH-2 : TP102/VP-43P, VP-43AP board (P-1)  
TRIG : CH-2  
\* UVW-1400P/1200P : VP-44P, VP-44AP
2. Playback the alignment tape CR2-1B PS.
3. Running the tape in play mode, press the RESET button on the sub control panel to set the video tracking in the center position.
4. Press the Left and Right keys on the sub control panel which shift the video tracking. Check that the RF signal amplitude decreases when the video tracking is off tracking. (Refer to Fig-1.)
5. Press the RESET (NO) button on the sub control panel. Check that the center of the RF envelope has the maximum amplitude. (Refer to Fig-2.)
6. If the requirements in steps 4 and 5 are not satisfied, perform the next adjustment.

### Adjustment procedure

7. Loosen the two screws fixing the CTL head ass'y about 1/2 turn. Insert -3 mm screw driver tip into the cut-out of the base. Move the CTL head in the direction shown by arrow to obtain the maximum amplitude at the center of the RF envelope. (Refer to Fig-3.)

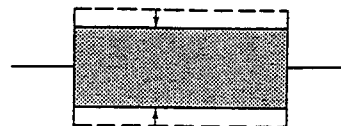


Fig-1.

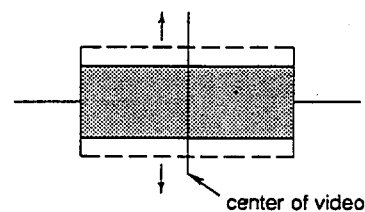


Fig-2.

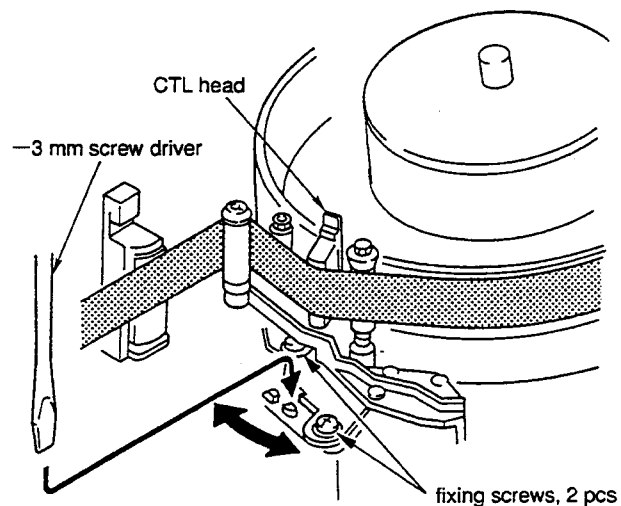


Fig-3.



**SONY.**

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VIDEOCASSETTE RECORDER

**UVW-1800P**

VIDEOCASSETTE PLAYER

**UVW-1600P**

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**SERVICE MANUAL**

Vol.1 1st Edition

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**BETACAM SP**

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## Introducing this manual

This manual is the Service Manual Vol. 1 of the video cassette recorder model UVW-1800P and the video cassette player model UVW-1600P.

This manual contains the maintenance information and servicing information necessary for parts replacement and adjustment.

## Contains

The sections covered in the manual are summarized below to give you a general understanding of the manual.

- Section 1 OPERATING INSTRUCTION
- Section 2 INSTALLATION
- Section 3 SERVICE OVERVIEW
- Section 4 MAINTENANCE MENU
- Section 5 PERIODIC MAINTENANCE AND INSPECTION
- Section 6 REPLACEMENT OF MECHANICAL PARTS
- Section 7 TAPE PATH ALIGNMENT
- Section 8 ELECTRICAL ALIGNMENT OVERVIEW
- Section 9 POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT
- Section 10 SERVO ALIGNMENT
- Section 11 AUDIO / TIMECODE ALIGNMENT
- Section 12 VIDEO ALIGNMENT
- Section 13 ELECTRICAL ALIGNMENT AFTER REPLACEMENT BOARDS

## Related manuals

In addition to this Service Manual Vol. 1, the following manuals are provided.

- **Operation Manual (Supplied with equipment)**

Explains how to operate this equipment.

- **Installation Manual (Not supplied with equipment)**

Contains rack mount information necessary for installation of the equipment, the connector information necessary for connecting the unit with peripherals and others.

- **Service Manual Vol. 2 (Not supplied with equipment)**

Contains the block diagrams, board layouts, schematic diagrams, parts lists.

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#### UVW-1800P

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## SECTION 1 OPERATING INSTRUCTION

This section is extracted from  
operation manual.



To make the fullest use of the many capabilities of this unit, note the following important points first.

## Reference video input

This unit is designed to be operated with an external reference video signal supplied. Always therefore, input a composite video signal, synchronized to the signal to be recorded, to the REF VIDEO INPUT connector. This will enable the time base corrector (TBC) to operate correctly, and ensure distortion-free recording.

## Input video signal type selection

For recording, it is important that the VIDEO IN switch on the subsidiary control panel is correctly set to match the type of video signal input. In particular, when inputting a component signal, set this switch to the "Y-R,B" position, and set the component signal input connector selection switch on the rear panel to the appropriate position. If these switches are not set correctly, not only will recording not be possible, but the input signal will also not appear on the monitor.

## Cassette record protection

When the record-inhibit plug on the cassette is pushed in, it is not possible to record. Use this feature to prevent inadvertent loss of recorded material which you wish to keep.

## If the tape transport buttons do not operate...

Unless the LOCAL ENABLE menu is set to "ALLOWABLE" in the menu, when the REWIND mode indicator in the tape transport buttons is displayed, in this case, change the menu setting to "STOP & EJECT".

## Features

The UVW-1800/1800P is a Betacam SP videocassette recorder, capable of recording and playing back composite video, component video and analog audio signals. With an external control unit connected, jog and shuttle functions are available, and the unit can be used as the recorder in an editing system.

### Betacam SP format

#### Excellent video and audio characteristics

Compared with a conventional format, Betacam SP format provides better video and audio performance, with improved signal-to-noise ratio, frequency characteristics, and detail reproduction, and greatly enhanced overall video and audio quality.

#### Compatibility with other Betacam SP VTRs

A metal tape cassette recorded on this unit can also be played back on other Betacam SP VTRs. Again, metal tape cassettes recorded on other Betacam SP VTRs can be played back on the UVW-1800/1800P. The cassette size is detected automatically.

### Full range of recording and playback functions

#### Built-in time code generator and reader

The built-in time code generator allows the unit to record time codes (LTC or user bits) simultaneously with the video and audio signals. The built-in time code reader allows the unit to read time codes (LTC or user bits) from a tape.

#### Built-in time base corrector (TBC)

The built-in time base corrector allows you to obtain a stable playback picture with no horizontal jitter or color fluctuation.


#### Microprocessor servo system

Four microprocessor-controlled DC motors provide direct drive for the drum, capstan and reels, enabling quick and accurate tape access.

#### Audio noise reduction

Longitudinal audio tracks 1 and 2 use the same Dolby-C<sup>®</sup> noise reduction as a conventional Betacam SP system. These circuits are always operating when recording or playing back.

1) Dolby-C<sup>®</sup> Dolby noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.

Dolby and the double-D symbol  are trademarks of Dolby Laboratories Licensing Corporation.

## Chapter 1 Overview

This chapter overviews the features of the UVW-1800/1800P.

Features ..... 1-2 (E)

**Compact, power-saving design**

The unit is light and simple, and very energy-efficient.

**Menu-based set-up system**

All the initial settings for system operation conditions and so forth are accessed through a simple menu system, from the subsidiary control panel.

**Remote control function**

The unit can be operated from a remote control unit through the RS-422A serial interface.

It is also possible to use the CONTROL S connector on the front panel to connect a simple remote control unit (SIRCS type remote control unit such as an SYRSM-100) to carry out search operations.

**Digital hours meter**

The digital hours meter keeps cumulative totals of four values: the total hours powered on, the film rotation time, the tape running time, and the numbering of threading/unthreading operations. These are displayed as superimposed text on the video monitor.

**Superimposed text output**

The VIDEO 2 (SUPER) OUTPUT connector provides a monitor video output which can have various information (time codes, tape speed, system settings, etc.) superimposed on it. The superimpose function can be enabled or disabled as required.

**S-Video connectors**

With VTRs or other peripheral equipment having S-Video connectors, these connectors provide a high-grade interface for video signal transfer.

**Self-diagnosis functions**

If an operating fault occurs, the system attempts to diagnose the problem, and produces an error code on the time counter display and superimposed video output.

**Alarm indications**

If an erroneous operation or connection is made, the system superimposes information on the monitor screen giving nature of the error and actions to be taken. The cause of the problem is also indicated in the time counter display.

## Front Panel

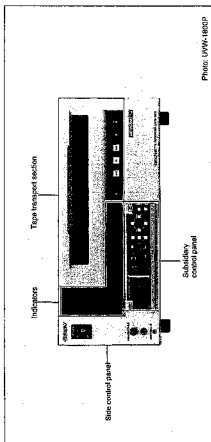


Photo: UPM-1000P

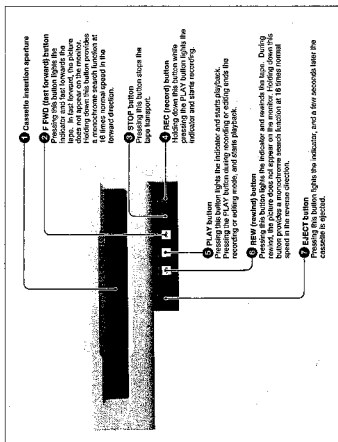
Front Panel

## Chapter 2 Identification of Parts and Controls

This chapter lists the names of all the controls and other components used in the operation of the unit.

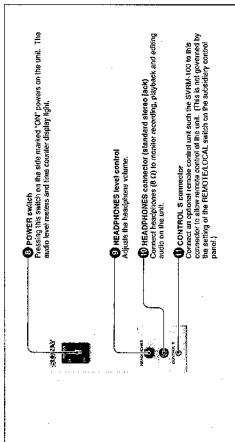
Front Panel	2-2 (E)
Rear Panel	2-5 (E)

### Tape transport section



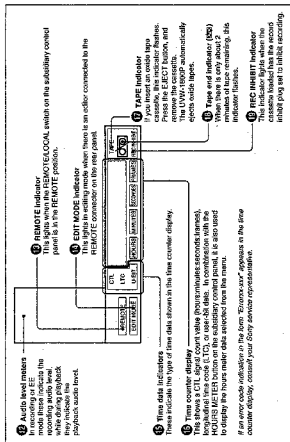
Tape transport section

## Side control panel



Side control panel

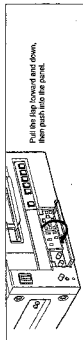
## Indicators



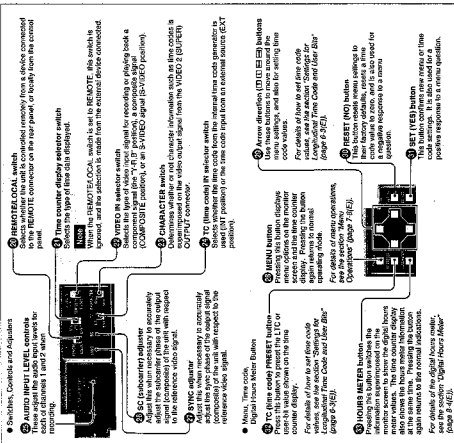
Indicators

## Subsidiary control panel

The subsidiary control panel is behind a flap on the front panel. Open the flap as shown in the figure.

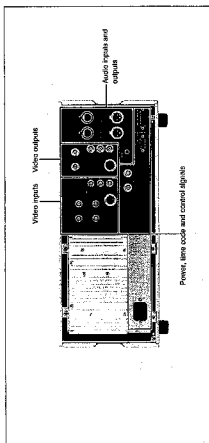


Accessing the subsidiary control panel



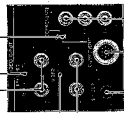
Subsidiary control panel

## Rear Panel



### Video inputs

- REF. VIDEO TS CL Repetition switch**  
Set this switch to the ON position when using both REF. VIDEO INPUT connectors for a loop-through connection, and to the ON position when not.
- REF. VIDEO INPUT connectors (BNC)**  
Input a reference video signal. The two connectors can be used for a loop-through connection.
- VIDEO TS CL Repetition switch**  
Set this switch to the OFF position when using both VIDEO INPUT connectors for a loop-through connection, and to the ON position when not.
- VIDEO INPUT connectors (BNC)**  
Input a composite video signal. The two connectors can be used for a loop-through connection.
- S-VIDEO INPUT connector (4-pin)**  
Input a composite video signal. The two connectors can be used for a loop-through connection.
- COMPONENT 1 INPUT connector (15-pin)**  
Connect a component video signal to be connected to a component video signal.
- COMPONENT 2 INPUT connectors (BNC)**  
Connect a component video signal to be connected to a component video signal.



Video inputs

### Video outputs

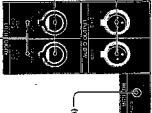
- VIDEO 1 and 2 (SUPER) OUTPUT connectors (BNC)**  
Output composite video signals. Select the output connector to be used by setting the CH-SELECT switch to the ON position. Character information is output from the VIDEO 2 (SUPER) OUTPUT connector.
- COMPONENT 2 OUTPUT connectors (BNC)**  
Output separate component video signals (Y, R-Y and B-Y).

- S-VIDEO OUTPUT connector (4-pin)**  
Output a composite video signal. Use the optional VDC-03 12-pin connector to connect to a component video signal.
- COMPONENT 1 OUTPUT connector (15-pin)**  
Output a component video signal.

Video outputs

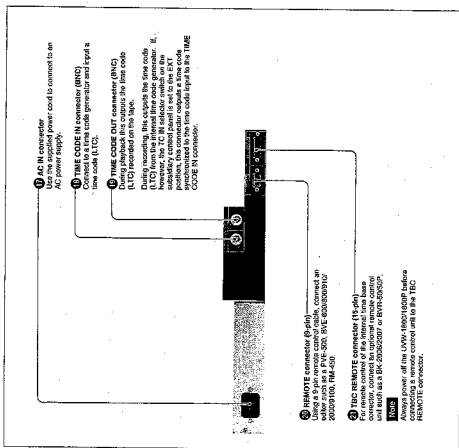
### Audio inputs and outputs

- MONITOR AUDIO connector (RCA)**  
Connect an audio signal to the video monitor.
- AUDIO INPUT 480.0 ON/OFF switch**  
Select the input impedance of audio input channels 1 and 2 to 600 Ω (ON position) or 16 Ω (OFF position).
- AUDIO INPUT CH-1 and CH-2 connectors (XLR 3-pin)**  
Connect an audio signal to the video deck or from audio equipment.
- AUDIO OUTPUT CH-1 and CH-2 connectors (XLR 3-pin)**  
Output audio signals.



Audio inputs and outputs

## Power, time code and control signals



Power, time code and control signals

# Before Use

## Safety notes

### Power supply

- Ensure that the unit is connected to a power supply of the correct rating.
- Do not place any heavy objects on the power cord, and be careful not to damage the power cord. Using a damaged power cord is dangerous.
- When disconnecting the power cord, not pull the cord itself, hold the plug while pulling it out.

### Do not dismantle the unit

Do not remove the casing. If you insert your hand there is a danger of electric shock.

### Do not drop foreign objects into the casing

If flammable objects, metal objects, water or other undesirable substances enter the casing, this can be a cause of malfunction.

### In the event of a malfunction

If there should be a strange sound or smell or smoke emanating from the unit, immediately power off the unit, and disconnect the power supply and all signal connections, then refer to your supplier or Sony service representative.

## Notes on operation

### Operation and storage locations

Avoid operation or storage in any of the following places.

- Locations subject to extremes of temperature (operating temperature range: 5 °C to 40 °C (41 °F to 104 °F))
- Locations subject to direct sunlight for long periods, or close to heating appliances (Note that the interior of a car left in summer with the windows closed can exceed 50 °C (122 °F)).

### Operate the unit in a horizontal position

This unit is designed to be operated in a horizontal position. Do not operate it on its side, or tilted through an excessive angle (exceeding 20 °).

### Avoid violent impacts

Dropping the unit, or otherwise imparting a violent shock to it, is likely to cause it to malfunction.

### Do not obstruct ventilation openings

To prevent the unit from overheating, do not obstruct the ventilation openings, by for example wrapping the unit in a cloth while it is in operation.

### Care

If the casing or panel is dirty, wipe it gently with a soft dry cloth. In the event of extreme dirt, use a cloth soaked in a neutral detergent to remove the dirt, then wipe with a dry cloth. Applying alcohol, thinners, insecticides, or other volatile solvents may result in deforming the casing or damaging the finish.

### Shipping

- Always remove the cassette before shipping the unit.
- Pack the unit in its original carton or equivalent packing, and take care not to impart violent shocks in transit.

# Chapter 3 Preparations

This chapter describes various preparatory aspects of operation of the UYW-1800/1800P.

Before Use .....	3-2 (E)
Cassettes .....	3-3 (E)
Cassettes Which Can Be Used .....	3-3 (E)
Inserting and Ejecting a Cassette .....	3-4 (E)
Record Initiate Function .....	3-4 (E)
Reference Video Signals .....	3-5 (E)



## Cassettes

### Cassettes Which Can Be Used

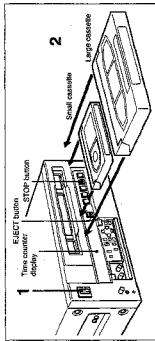
This unit only accepts metal tapes.  
Use the following 1/2-inch Betamax SP cassettes.

Metal tape	
Small (S) cassettes	BCT-5MA10MA/20MA/30MA, UVWYT-12MA/20MA/30MA
Large (L) cassettes	BCT-5MLA10MLA/20MLA/30MLA/40MLA, UVWYT-60MLA/120MLA

### Inserting and Ejecting a Cassette

Always check that the unit is powered on before attempting to insert or eject a cassette.

#### Inserting a cassette



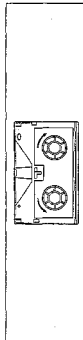
- 1 Turn the POWER switch on.
- 2 Check the following points, then insert the cassette:
  - The cassette must be inserted with the side that the tape is visible upmost.
  - The cassette must be inserted with the side that the tape is visible upmost.
  - There must be no message "HUMID" in the time counter display.

For details of how to remove slack in the tape, see the section "Removing slack in the tape" (on the next page).  
The message "HUMID" appears in the time counter display, see Section "Condensation" (page 8-1E).

To insert a small cassette, align it with the marks on the cassette compartment.  
The cassette is automatically drawn into the unit, and the tape wound round the head drum. The tape is stationary while the lead drum rotates, and the STOP button lights.

## Cassettes

**Removing slack in the tape**  
Carefully rotate one of the reels with your finger in the direction of the arrows until it stops.



Removing slack in the tape

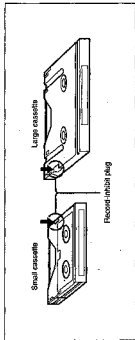
**No double insertion of cassettes**  
When you insert a cassette, the orange lock-out plate appears in the cassette compartment to prevent double insertion.

#### Ejecting the cassette

Press the EJECT button.  
The tape is wound back into the cassette (this takes several seconds), and then the cassette is ejected from the unit.  
If the time counter display is showing CTL values, it is reset.

### Record Inhibit Function

To protect recorded material which you wish to keep, press in the record-inhibit plug on the cassette.



Record-inhibit plug

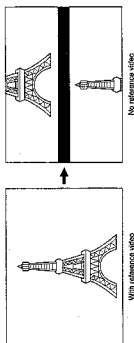
When you insert a cassette with the record-inhibit plug pushed in into the cassette compartment, the REC INHIBIT indicator lights, and it is not possible to record.

To re-record on the cassette, return the record-inhibit plug to its original position.

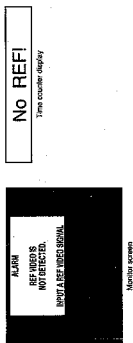
## Reference Video Signals

When this unit is being used, a composite video signal, synchronized to the signal being used must be input to the REF VIDEO INPUT connector to enable the time base corrector (TBC) to operate correctly, and ensure stable operation.

If no reference video signal is input, then during recording or editing, or in RE mode the monitor screen will tend to drift vertically, as shown in the figure below.



The monitor screen and the time counter display also show alarm messages. (Example: When the VIDEO 2 (SUPER) OUTPUT connector is used with the "REF ALARM" set to ON in the menu.)



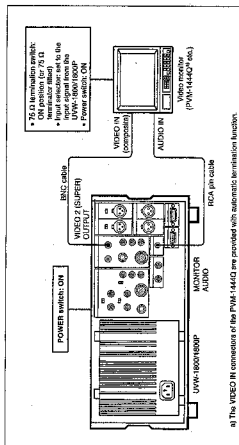
During playback, a monitor picture is normally stable without a reference video signal input.

For details of changing the menu settings, see the section "Menu Operations" (page 7-RE).

This section describes the connections, switch settings, and basic operating procedures for playback of both video and audio signals.

## Preparation for Playback

Connect the unit to the monitor and make the switch settings as shown in the following figure.



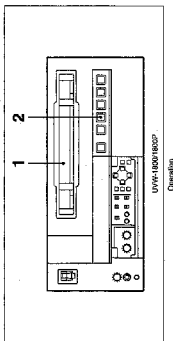
a) The VIDEO IN connections of the PVM-1440 are provided with automatic termination function.  
Connections and switch settings

## Chapter 4 Recording and Playback

This chapter describes the preparation necessary before using the unit for recording or playback, including connections and switch settings, and basic operating procedures. It also describes the text information which can be superimposed on the monitor screen.

Playback Operation	4-2 (E)
Preparation for Playback	4-2 (E)
Playback Operation	4-3 (E)
Recording Operation	4-4 (E)
Preparation for Recording	4-4 (E)
Recording Operation	4-6 (E)
Superimposed Text Information	4-7 (E)

## Playback Operation



### 1 Insert a cassette.

The STOP button lights, then a few seconds later the tape is ready to start running. At this point a still picture appears on the monitor. Always be sure to use a metal tape.

### 2 Press the PLAY button.

Playback begins.

### To stop playback

Press the STOP button.

This puts the UYW-1600/1800P into stop mode. This unit automatically enters standby-off mode if it is left in stop mode for eight minutes.

You can change the time to switch to stand-by off mode in the TAPE PROTECTION menu. For details, see under "TAPE PROTECTION" (page 7-6(E)).

### If the tape reaches the end during playback

The tape is automatically rewound to the beginning and the unit stops. You can disable this automatic rewinding function using the menu.

For details, see "AUTO REW" (page 7-3(E)).

### Adjusting the audio playback volume

Carry this out on the monitor.

### Simple search function

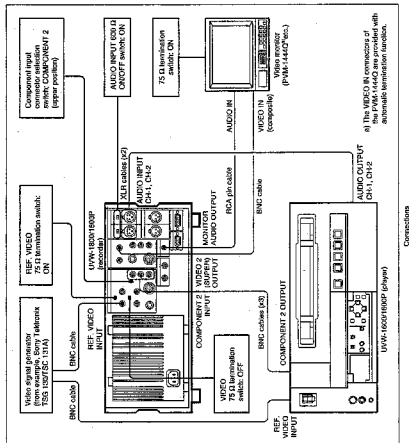
Holding down the F.FWD or REW button provides a monochrome search function at 16 times normal speed in the forward or reverse direction respectively. Press the PLAY button again to return to normal playback.

## Recording Operation

This section describes the connections, switch settings, and basic operating procedures for recording a composite video signal and audio signal.

### Preparation for Recording

Connect this unit as the recorder and a UYW-1600/1800P as the player as shown in the following figure. To check the video and audio signals being recorded, connect the UYW-1800/1800P to a monitor as described in the Section "Playback Operation" (page 4-2(E)).



a) The VIDEO IN connectors of the PMA-1440 are provided with automatic termination function.

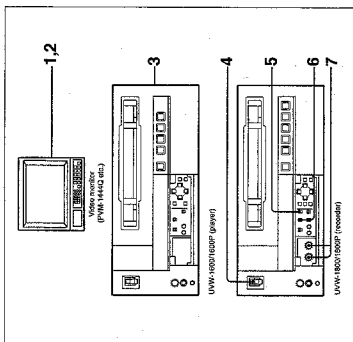
### Note

If you do not input a reference video signal, the monitor picture will be subject to vertical instability. When carrying out recording, always input a reference video signal.

For details of reference video signals, see the Section "Reference Video Signals" (page 3-4(E)).

## Switch and control settings

After completing the connections, make the switch and control settings as follows.

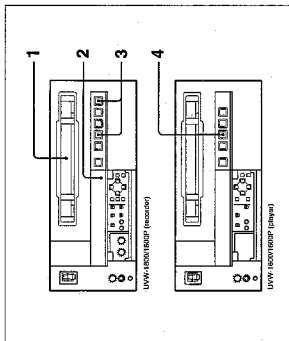


Switch and control settings

- 1 Power on the video monitor.
- 2 Set the input selector of the monitor to the input connector connected to the UYW-1800/1800P.
- 3 Following the instructions in the appropriate operation manual, and prepare the player for playback.
- 4 Power on the UYW-1800/1800P.
- 5 Set the VIDEO IN selector switch to COMPOSITE.
- 6 Set the time counter display selector switch according to the time data to be used.
- 7 Adjust the AUDIO INPUT LEVEL controls so that the audio level meters indicate around 0 VU when the audio signal is at its maximum.

## Recording Operation

In order to carry out recording of the video and audio signals, check that you have made the connections and carried out the switch setting procedure correctly, then use the following procedure.



Operation

- 1 Insert a cassette in the UYW-1800/1800P.  
Always be sure to use a metal tape.  
Before inserting the cassette, check that it is not record-inhibited.  
*For details see the Section "Record Inhibit Function" (page 3-4(E)).*
- 2 Check that the REC INHIBIT indicator is not lit.
- 3 Hold down the REC button, and press the PLAY button.  
Recording starts.
- 4 Press the PLAY button on the player.  
Playback starts.  
**To stop recording**  
Press the STOP button.

### Superimposed Text Information

When the subsidiary control panel CHARACTER switch is in the ON position, the video signal output from the VIDEO 2 (SUPER) OUTPUT connector includes superimposed indications of time data and the operating state of this unit.

### Selecting the information displayed and the character type and position of the indications

The information displayed and the character type and position of the indications can be selected by using the menu item "DISPLAY CONTROL." The factory default settings are as follows.

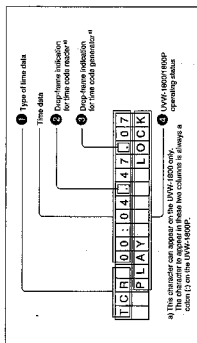
**Information displayed :** Time data selected by the time counter display selection

switch, and the operating status of the unit

Character type : White characters on a black background

**Character position** : Bottom center of the screen

For details of the setting method, see under "DISPLAY CONTROL" (page 7-4(E)).



Displayed information (factory default):

① Type of time data

This indicates the type of time data as follows.

Indication	Meaning
CTL	CTL counter data
TGR	LTC reader data
UBR	LTC reader user bit data
YCG	Time code data from time code generator
UBG	User bit data from time code generator
T+R	Time code data from time code reader. Interpreted by five time code reader to make up for five time code data not correctly read from the tape.
U+R	User bit data from time code reader. Interpreted by five time code reader to make up for five time code data not being read correctly from the tape.

Chapter 4 Recording and Playback

**② Drop-frame indication for time code reader  
(on UVW-1800 only)**

" " : A single dot indicates drop-frame mode.  
" " : Two dots (i.e. a colon) indicate non-drop-frame mode.

③ Drop-frame indication for time code generator  
(on LUVV-1800 only)

": " : A single dot indicates drop-frame mode, ": " : Two dots (i.e. a colon) indicate non-drop-frame mode.

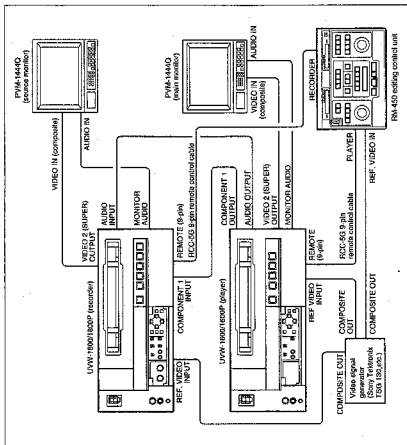
## ④ UVW-1800/1800P operating status

Indication	Operating status
THREADING	Cassette is inserted, and tape is being threaded.
UNTITREADING	Tape is being unthreaded to object cassette.
CASSETTE OUT	No cassette is inserted.
STANDBY OFF	Tape is not on standby.
T.RELEASE	Tape function is released.
STOP	Tape is stopped.
F.FWD	Fast forward.
REW	Rewind.
PREROLL	Play (serve not locked)
PLAY	Play (serve locked)
PLAY	Recording (serve not locked)
REC	Recording (serve locked)
STOP	Pause (serve locked)
LOCK	Fast mode (serve not locked)
EDIT	Fast mode (serve locked)
EDIT	Still picture in big mode
JOG	Still picture in forward direction (▶ indicator lights)
JOG	Still picture in reverse direction (◀ indicator lights)
JOG REV	Still picture in forward direction (▶ indicator lights)
JOG	Still picture in reverse direction (◀ indicator lights)
SHUTTLE	Shuttle mode (all-feedback source)

By connecting two or more UVW-1800/1800P units or using UVW-1600/1600P units as players, and connecting an editing control unit such as a PVE-500 it is possible to assemble an editing system; the UVW-1800/1800P can be used as the recorder in such an editing system. This section describes the connections required for cut editing and for A/B roll editing, and the phase adjustments required for editing.

**Cut Editing** ..... 5-2 (E)  
**A/B Roll Editing** ..... 5-6 (E)  
**Phase Adjustments** ..... 5-11 (E)

For details of editing operations, refer to the operation manual for the editor being used.  
For details of the connections and settings on each of the other pieces of equipment, refer to the respective operation manuals.



Example's configuration of system for our editing (component signals)

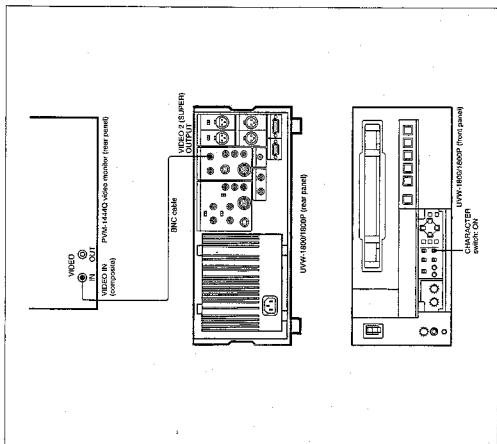
Switch settings on the UVW-1500/1800P (recorder) and UVW-1600/1600P (player).

	Switches		UWV-1800/1800P	UWV-1600/1600P
	REMOTE/LOCAL switch	REMOTE		
VIDEO IN selector switch		Y, R, B	-	-
Component input connector selection switch		1	ON	ON
AUDIO INPUT 600 $\Omega$ ON/OFF switch		ON	ON	-
REF. VIDEO 75 $\Omega$ termination switch		ON	OFF	OFF

### Monitoring the video signals

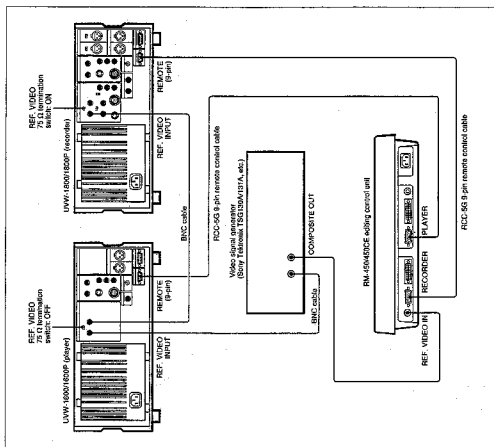
To monitor the video signals, connect monitors as shown in the figure below. The connections are the same for the recorder and player.

To obtain superimposed information on the monitor screen, set the CHARACTER switch to the ON position.



Connecting a video monitor

### Reference video signal and editor connections

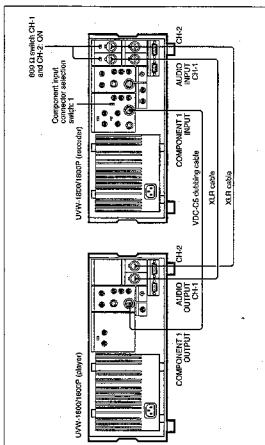


Reference video signal and editor connection

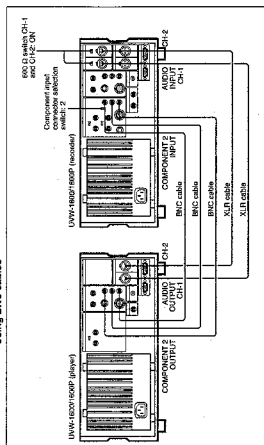


## Video and audio signal connections

Using BNC cable and VDC-C5 dubbing cable

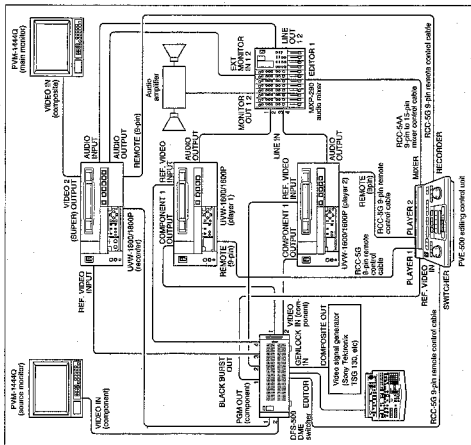


## Using BNC cables



Video and audio signal connection 2

The figure below illustrates a system for A/B roll editing using the UYW-1600/1600P with two UYW-1600/1600P units.



Example configuration of system for A/B roll editing (component signals)

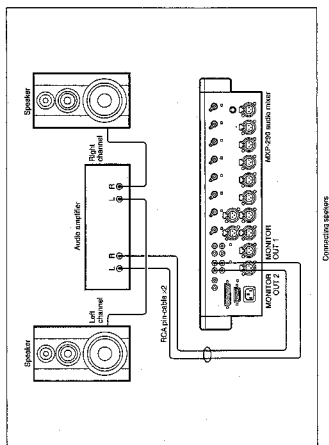
Switch settings on the UYW-1600/1600P (recorder) and UYW-1600/1600P (player)

Switches	UYW-1600/1600P (recorder)	UYW-1600/1600P (player)
REMOTE/LOCAL switch	REMOTE	REMOTE
VIDEO IN selector switch	Y-R, B	Y-R, B
Component input connector selection switch	1	1
AUDIO INPUT 600 Ω ON/OFF switch	ON	ON
REF. VIDEO 75 Ω termination switch	ON	ON

## Monitoring the audio and video signals

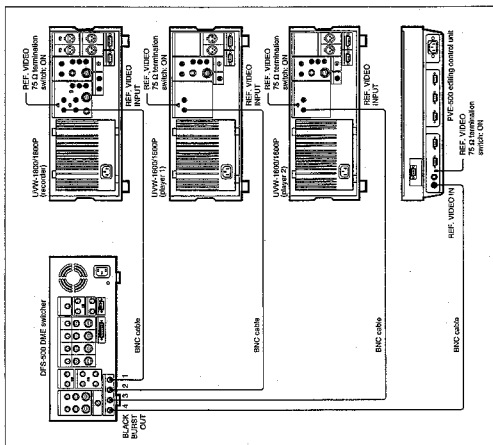
To monitor the audio signals, connect speakers as shown in the figure below.

For details of video monitor connections, see the section "Monitoring the video signals" under "Cut Editing" above (page 5-3(E)).



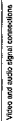
Connecting speakers

## Reference video signal connections



Reference video signal connections

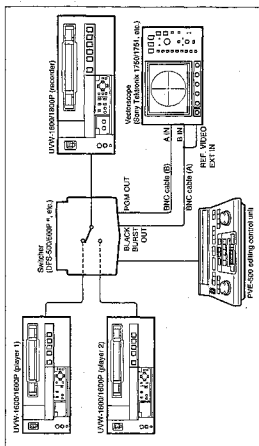
## Video and audio signal connections



# Phase Adjustments

## • Phase Adjustments

When using two or more players, as in an A/B roll editing system, phase synchronization of the signals (i.e. system sync) is necessary, and for composite signals only, the subcarrier phase must also be in sync. If not, picture intelligibilities or color break-up may occur at edit points. After configuring the editing system, use a Vectorscope to adjust the sync and subcarrier phase of the recorder and players. Subcarrier phase adjustment is necessary only when using composite signals.



Connections for phase adjustment

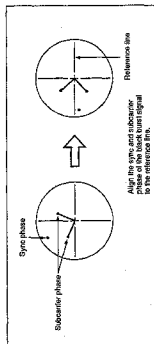
## Phase adjustment procedure

- 1 Press the SCH button on the Vectorscope.  
The Vectorscope switches to "SCH" mode.
- 2 Press the B channel button on the Vectorscope.  
This displays the black burst signal from the switcher.
- 3 Press the EXT button on the Vectorscope.  
This switches the Vectorscope to external synchronization mode.

(Continued)

## Phase Adjustments

- 4 Adjust the phase synchronization control on the Vectorscope so that the sync and subcarrier phases are close to the reference line.

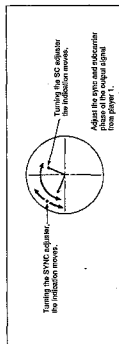


- 5 Output the player 1 signal from the PVE-500.

- 6 Press the A channel button on the Vectorscope.

This displays the sync phase and subcarrier phase (composite signals only) of the signal from player 1.

- 7 On the subsidiary control panel of player 1, adjust the SYNC and SC adjustment controls, using a Phillips screwdriver, so that the output from player 1 on channel (A) is in correct phase alignment with the black burst signal on channel (B).



## Notes

When component signals are used the subcarrier phase does not appear.

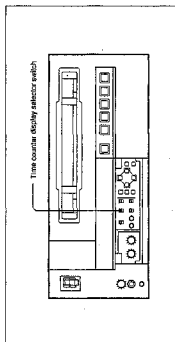
- 8 Output the player 2 signal from the PVE-500.

Repeat steps 6 and 7 to adjust the sync and subcarrier phase of the output from player 2.

During recording or playback, you can display the time data selected on this unit on the monitor and on the time counter display. During editing, the data displayed is selected by the editor.

### On the time counter display

Use the time counter display selector switch to select the data to be displayed on the time counter display.



Time counter display selector switch

### Resetting the CTL data displayed

Press the RESET button.

The indication in the time counter display is reset to "0:00:00.000".

### On the monitor screen

See the section "SuperImposed Text Information" (page 4-7(E)).

## Chapter 6 Time Data

The time data used by the UYW-1800/1800P for both recording and display include CTL signal count values, longitudinal time codes (LTC), and user bit data. This chapter describes how to display time data, and how to set LTC and user bit values.

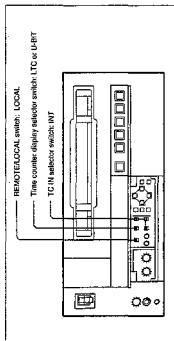
Displaying Time Data .....	6-2 (E)
Settings for Longitudinal Time Code and User Bits .....	6-3 (E)
Synchronizing the Internal Time Code Generator With an External Time Code Generator .....	6-6 (E)

## Settings for Longitudinal Time Code and User Bits

Using the internal time code generator it is possible to preset the longitudinal time code (LTC) value to be recorded on the tape to any desired initial value. This section describes how to preset the LTC value, and also how to preset the user bit data which is also written on the same track.

### Switch and menu settings

Carry out the following switch and menu settings.



Switch settings

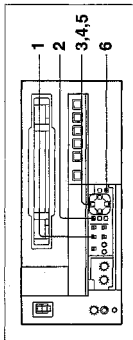
Menu settings

Mode	Setting
RUN MODE	"FREE RUN" or "REC RUN"
DF MODE (for U-VW-TRSD only)	Normally "DF"

For details of the RUN MODE and DF MODE settings, see under "TIME CODE" (page 7-56).

## Settings for Longitudinal Time Code and User Bits

### Setting procedure



Setting the initial value for time code or user bits

1 Set the time counter display selector switch to LTC or U-BIT, to display the required time data on the monitor and time counter display.

2 Press the TC PRESET button.

The current setting is displayed on the monitor screen and the time counter display. At this point the leftmost digit flashes.

One of the following displays appears on the monitor screen.

TO PRESET MODE  
TOD 00:00:00:00  
UP : DATA INCREMENT  
DOWN : DATA DECREMENT  
LEFT : LEFT SHIFT  
RIGHT : RIGHT SHIFT  
RESET : DATA CLEAR  
TC PRE : PRESET  
TC PRE1 : PRESET & EXIT

Time code presetting

UP PRESET MODE  
UBS 00:00:00:00  
UP : DATA INCREMENT  
DOWN : DATA DECREMENT  
LEFT : LEFT SHIFT  
RIGHT : RIGHT SHIFT  
RESET : DATA CLEAR  
TC PRE : PRESET  
TC PRE1 : PRESET & EXIT

User bit presetting

### Note

If you press the TC PRESET button while CTL value is displayed, the following alarm message appear on the monitor screen.

ALARM  
CTL MODE IS SELECTED.  
SET COUNTER SWITCH  
TO TC OR UB.

CTL mode!

Set the time counter display selector switch to LTC or U-BIT.

- 3 Use the  $\square$  and  $\square$  buttons to select the digit in the value which is flashing.
- 4 Use the  $\square$  and  $\square$  buttons to adjust the value of the flashing digit.  
Note that user bit data values are in hexadecimal (digits 0-9 and A-F).
- 5 Repeat steps 3 and 4 as required to set the required value.  
To set the value to 00:00:00:00, press the RESET (NO) button.
- 6 Press the SET (YES) button.

Either of the two displays shown immediately below appears on the monitor screen and the third display shown below in the time counter display.



Once the setting is saved, the monitor screen and time counter display return to normal.

## NOTE

If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before powering the unit off.

## Internal time code generator running modes

There are two different modes of operation for the internal time code generator, selected by the RUN MODE setting as follows.

“FREE RUN”: The time code generator begins to run from the instant the preset value is saved.

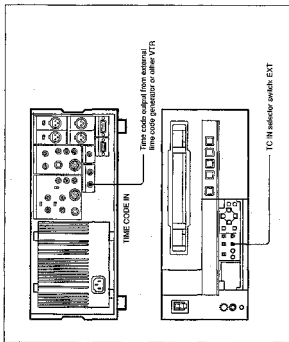
“REC RUN”: The time code generator runs only during recording.

**Presetting the time data value to reflect real time**  
In this menu, set RUN MODE to “FREE RUN”, and set the time data value to the current time.

If a time code signal (LTC values) is input to this unit, the internal time code generator is automatically synchronized to the time code value input from an external source. Using this function, it is possible to have a number of VTRs all set to synchronized time codes, and to copy time codes precisely from one tape to another.

## Connections and switch settings

Carry out the following connections and switch settings.



## Connections and switch settings

When an external time code is input, the running mode of the internal time code generator is as follows.

## RUN MODE: Automatically set to “FREE RUN.”

**DF MODE (for UVM-1800 only):** Automatically set to either drop-frame mode or non-drop-frame mode according to the mode of the input time code.

After setting the TC IN selector switch to EXT position, the internal time code generator begins to run in synchrony with the external time code generator. The internal time code generator continues to run in the same way even if the external time code generator is disconnected.

## Checking the internal time code generator counting

Stop the tape, and press the REC button.

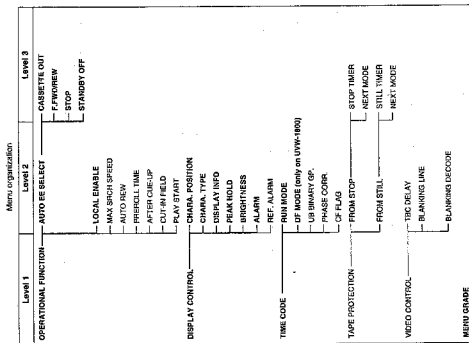
Check that the same value as the input time code value is displayed.

# Menu Organization

## Hierarchical Structure

The menu screens are arranged in a three-level tree structure, as shown in the figure below. The top-level selections (level 1) access the main divisions of the settings, and except for the MENU GRADE item, the settings themselves are made on levels 2 and 3. The screens are divided into two groups: the basic settings, to which frequent access is normally required, and extended settings, which are less frequently used.

In the following figure, bold lines indicate the basic menu screens, and thin lines the extended menu screens.



## Chapter 7 Menus

This chapter describes the organization of the principal set-up menus (selecting the superimposed information on the monitor screen, line code, run mode, etc.) and how to use them.

Menu Organization	7-2 (E)
Hierarchical Structure	7-2 (E)
Menu Screens	7-3 (E)
Menu Operations	7-4 (E)
Buttons Used to Change the Setting	7-8 (E)
Operation Sequence	7-9 (E)





# Menu Organization

Menu selections (continued)

DISPLAY CONTROL: Settings related to indications on the monitor and the unit	Description of settings
<b>BACK HOLD</b> (> RUN MODE) Peak hold time for audio level meters	Set the time from zero (OFF) to 1.5 seconds in steps of 0.1 second. 1.5 SEC (> 1.5 sec) -- > OFF (> OFF)
<b>BRIGHTNESS</b> (> Brightness) Brightness of front panel indicators	Set brightness as a percentage of the maximum. * 100% (> 100%) 65% (> 80%) 33% (> 35%)
<b>ALARM</b> Determine whether alarms are issued or not.	* ON (> ON): Alarms are issued. OFF (> OFF): Alarms are not issued.
<b>REF. ALARM</b> Determine whether alarms related to reference video signal are issued or not.	ON (> ON): Alarms are issued. * ON (LIMITED) (> ON Limited): Alarms are issued during recording. OFF (> OFF): Alarms are not issued.

Menu selections (continued)

TIME CODE: Settings related to the time code generator	Description of settings
<b>PHASE CORR</b> (> PHASE CORR) Time code generator phase correction	* OFF (> OFF): Phase is not corrected. ON (> ON): Phase is corrected.
<b>CF FLAG</b> Set color framing flag on or off in a unused bit of the internal time code generator of this unit. It has no effect on normal color framing.	* OFF (> OFF): Set color framing flag off. ON (> ON): Set color framing flag on.

TIME CODE: Settings related to the time code generator	Description of settings
<b>RUN MODE</b> (> RUN MODE) Set to "FREE RUN" when carrying out editing with an editor. With the "REC RUN" setting, assemble editing and other operations will not be carried out correctly.	* FREE RUN (> FREE RUN): Time code generator runs with the "REC RUN" setting. Time code generator only runs while recording.
<b>DO MODE</b> (> DO MODE) Select whether the time code generator and CTL counter operate in drop-frame or non-drop-frame mode. When the "DO MODE" setting is set to "DO" with the real time, the non-drop-frame mode is used for example when using computer graphics, and working on a frame count basis.	* ON (DP) (> ON DP): Drop-frame mode. OFF (NDP) (> OFF NDP): Non-drop-frame mode.
<b>UB BINARY GP</b> (> UB BINARY GP) Set the time code generator to output a binary group flag of the time code generator.	* 000 (> 000): Character set not specified. 001 (> 001): Undefined. 010 (> 010): Undefined. 011 (> 011): Undefined. 100 (> 100): Undefined. 101 (> 101): Nullvalue. 110 (> 110): Nullvalue. 111 (> 111): Undefined.
<b>UB BINARY GP</b> (> BINARY GP) Set the time code generator to output a binary group flag of the time code generator.	* 00 (> 00): Not specified. 01 (> 01): ISO character. 10 (> 10): ISO character. 11 (> 11): Unassigned-2.

(Continued)

TAPE PROTECTION: Settings related to tape protection	Description of settings
<b>FROM STOP</b> (> FROM STOP) Protected mode and time to switch from stop mode to protected mode.	Select time from 15 settings from 0.5 seconds to 30 seconds. 30 MIN (> 30 min) -- > 8 MIN (> 8 min) -- 0.5 SEC (> 0.5 sec)
<b>NEXT MODE</b> (> NEXT MODE) Tape protection mode when time set from stop mode for the protection of the tape and head drum.	* STANDBY OFF (> STANDBY): Standby off mode. TENSION RELEASE (> T. RLSE): The tape tension is released, but the picture can still be seen on the monitor.
<b>STILL TIMER</b> (> STILL TIMER) Protected mode and time to switch from search mode still or pause.	Select time from 15 settings from 0.5 seconds to 30 seconds. 30 MIN (> 30 min) -- > 8 MIN (> 8 min) -- 0.5 SEC (> 0.5 sec)
<b>NEXT MODE</b> (> NEXT MODE) Tape protection mode when time set from search mode for the protection of the tape and head drum.	* STEP FWD (> Step): The tape is advanced at x16 speed for 2 seconds. STANDBY OFF (> STANDBY): Standby off mode. TENSION RELEASE (> T. RLSE): The tape tension is released, but the picture can still be seen on the monitor.

Menu selections (continued)

VIDEO CONTROL: Settings related to video control (Video)	Description of settings
TBC DELAY (T: TBC delay) When used as the recorder of an editing system, select TBC DELAY. When broadcasting, select VIDEO DELAY.	* SYNC DELAY (>> Sync): The synchronization signal included in the output video signal is delayed from the input video signal by the selected delay time. The TBC mode and output synchronized to the video signal. VIDEO DELAY (>> Video): The synchronization signal included in the output video signal is synchronized to the reference signal, and only the video signal output is delayed.
BLANKING LINE (L: BLK line) Determine whether or not to output video signals during blanking. Settings can be made for each of the lines 9 and 23 for UMW-1600, and between line 9 and 23 for UMW-1600P.	UMW-1600 12 LINE (>> 12 line) -20 LINE (>> 20 line) UMW-1600P 9 LINE (>> 9 line) -23 LINE (>> 23 line) * MASK (>> Mask): Video signal is output. HALF (>> Half): Only a half of video signal (only for line 9 for UMW-1600, and only for line 23 for UMW-1600P) is output. OUTPUT (>> Output): Video signal is output.
BLANKING DECODE (L: BLK decode) Method of separating luminance video signals into a luminance signal and chrominance signal during blanking. Settings can be made for each of the lines between line 12 and 19 for UMW-1600, and between line 9 and 23 for UMW-1600P.	UMW-1600 12 LINE (>> 12 line) -19 LINE (>> 19 line) UMW-1600P 9 LINE (>> 9 line) -23 LINE (>> 23 line) * BLACK & WHITE (>> BAW): Input signals are processed with black and white signals. BAW (>> BAW): Input signals are processed with a band pass filter.

MENU GRADE: Menu screen selection (Menu grade)	Description of settings
—	* BASIC (> Basic): Display basic menu screens. ENHANCED (> Enhanced): Display extended menu screens.

Although the menu screens are divided into basic and extended categories, the method of operation is the same.

This section describes as an example the procedure required to change the setting for the tape protection mode used when the deck is stopped. Check the location of this setting in the menu tree, by referring to the previous section; it is in the level 2 menu screen "TAPE PROTECTION", which is an extended menu screen.

## Buttons Used to Change the Setting

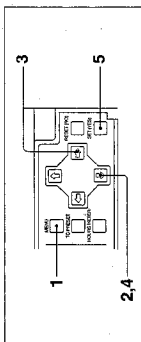
This operation uses the following buttons on the subsidiary control panel.

Buttons used to change the menu setting and their functions

MENU button	<ul style="list-style-type: none"> <li>Entering menu mode</li> <li>Leaving menu mode</li> </ul>
[D] TD buttons	Moving the reverse video cursor up and down to change the section within a menu screen; if held down, the reverse video cursor continues to move.
[R] RE buttons	<ul style="list-style-type: none"> <li>The [D] button moves to the menu at the next lower level.</li> <li>The [R] button moves to the menu at the next higher level.</li> </ul> If either button is held down, the reverse video cursor continues to move.
RESET (NO) button	<ul style="list-style-type: none"> <li>Returns a setting to its factory default.</li> <li>Answers 'no' to a question on the monitor screen.</li> </ul>
SET (YES) button	<ul style="list-style-type: none"> <li>Confirms a changed setting.</li> <li>Answers 'yes' to a question on the monitor screen.</li> </ul>

## Operation Sequence

Displaying the extended menus



Displaying the extended menus

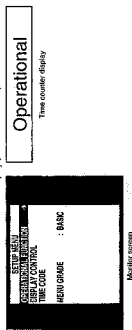
- 1 Press the MENU button.

The level 1 menu appears on the monitor screen. The factory default setting is basic menu screens only.

The reverse video cursor shows the current selection; in the figure below, this is "OPERATIONAL FUNCTION." The → mark indicates this item has an associated sub-menu.

The time counter display shows the selected item only, often in abbreviated form.

Level 1 menu display (basic menu screen)



Monitor screen

The "MENU GRADE" setting has no associated sub-menus. In such a case, the current setting also appears in abbreviated form to the right of the screen. When the factory default setting is currently selected, the "→" indication precedes that setting. In this case the setting does not appear on the time counter display.

- 2 Press the  $\square$  button to select "MENU GRADE: BASIC".

Selecting MENU GRADE: BASIC



Monitor screen

## Menu grade

Time counter display

- 3 Press the  $\square$  button.

This displays all of the settings, and the current selection appears on the monitor screen in reverse video. The ← mark indicates the "BASIC" has an associated menu at the next higher level. The "→" indication precedes the factory default setting.

Displaying the settings



Monitor screen

## > Basic

Time counter display

- 4 Press the  $\square$  button to select "ENHANCED".

Selecting ENHANCED



Monitor screen

## > Enhanced

Time counter display

(Continued)

## 5 Press the SET (YES) button.

The messages shown below appear in the monitor screen and the time counter display, and the new setting is saved in memory.

Messages when saving settings

Time counter display

Saving...



Once the saving operation is completed, both the monitor screen and time counter display return to the normal state.

## Notes

- If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before powering the unit off.
- If you do not press the SET (YES) button, and press the MENU button, the settings are not saved; the displays shown below appear for 0.5 seconds, and the menu system is forcibly exited. If making more than one setting, be sure to press the SET (YES) button after finishing all the desired settings.

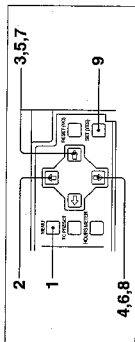
Forcibly aborting the menus

Time counter display

ABORT !



## Changing the "NEXT MODE" setting



Changing the NEXT MODE setting

## 1 Press the MENU button.

The level 1 extended menu appears on the monitor screen.

- The reverse video cursor shows the current selection, "MENU GRADE".
- "ENHAN", made in the previous section. When the currently selected setting is not the factory default setting, the "w" indication instead of the "v" indication precedes that setting.

Level 1 menu display (advanced menu screen)



Menu grade

Time counter display

## 2 Press the [Q] button to select "TAPE PROTECTION".

Selecting TAPE PROTECTION



Tape protect

Time counter display

## Menu Operations

- 3 Press the  button.


The level 2 menu screen appears.

When this menu appears for the first time, "FROM STOP" is selected.

Level 2 menu screen (TAPE PROTECTION)




Monitor screen

- 4 Press the  button to select "FROM STILL".

Selecting FROM STILL



Monitor screen

- 5 Press the  button.

The level 3 menu screen appears.

When this menu appears for the first time, "STILL TIMER" is selected.

Level 3 menu screen (FROM STILL)



Monitor screen

- 6 Press the  button to select "NEXT MODE".

Selecting NEXT MODE



Monitor screen

- 7 Press the  button.


The settings for "NEXT MODE" appear.

When this menu screen appears for the first time, "STEP TWD" is selected.

Selecting screen display



Monitor screen

- 8 Press the  button to select "TENSION RELEASE".

Selecting TENSION RELEASE



Monitor screen

(Continued)

### 9 Press the SET (YES) button.

The "Saving" message appears on the monitor (as shown below), and the new setting is saved in memory.

Messages when saving settings

Saving...

Time counter display



Monitor screen

Once the saving operation is completed, both the monitor screen and time counter display return to the normal state.

#### Notes

- If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before powering the unit off.
- If you do not press the SET (YES) button, and press the MENU button, the settings are not saved; the displays shown below appear for 0.5 seconds, and the menu system is forcibly exited. If making more than one setting, be sure to press the SET (YES) button before moving to the next item.

Forcibly aborting the menus

ABORT!

Time counter display



Monitor screen

### Returning menu settings to the factory default

#### Returning a specific menu setting to its factory default

In the screen for making the setting, press the RESET (NO) button.

In the examples above of the "NEXT MODIF" setting, press the RESET (NO) button in step 8 to return to the factory default of "STANDBY OFF".

#### Returning all menu settings to the factory default

- 1 Press the MENU button to display the level 1 menu.
- 2 Press the RESET (NO) button.

The following message appears on the monitor screen, which is intended to ask the user to confirm the reinitialization.

Request for confirmation of reinitialization



Monitor screen

Init setup?

Time counter display

### 3 Press the SET (YES) button.

This returns all menu settings to their factory defaults. The "Saving" message appears on the monitor, and the new setting is saved in memory.

#### Notes

- If you power off this unit while it is in the process of saving the settings, the reinitialization can not be ensured. Wait until saving is completed before powering the unit off.
- If instead of pressing the SET (YES) button, you press the RESET (NO) button, the reinitialization is not carried out, and the display returns to the level 1 menu screen.

## Self-Diagnosis Functions

The UVW-1800/1800P is provided with self-diagnosis functions which detect internal faults. If a fault is detected, the UVW-1800/1800P displays an error code in the time counter display and an error message on the monitor screen.

To display error messages on the monitor screen, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the subsidiary control panel must be in the ON position.

Error08-03A

Error code

Example error code displayed on the time counter display



Monitor screen error message

When an error message appears on the monitor screen, follow the direction displayed.

## Chapter 8 Maintenance

This chapter describes the self-diagnosis functions with which the UVW-1800/1800P is provided, the action to be taken in the event of condensation on the head drum, the digital hours meter, and the head-cleaning process needed to ensure high video and audio reproduction quality.

Self-Diagnosis Functions .....	8-2 (E)
Condensation .....	8-3 (E)
Regular Checks and Maintenance .....	8-4 (E)
Digital Hours Meter .....	8-4 (E)
Head Cleaning .....	8-5 (E)



If the unit is suddenly moved from a cold to a warm location, or used in a very humid place, moisture from the air can condense on the head-drum. If the tape is run in this state, the tape may stick to the drum, in which case it is highly likely to be damaged. To lessen the risk of this occurring, this unit is fitted with a condensation detection system.

## If moisture condenses on the head-drum while the unit is operating

The indication "HUMID" appears in the time counter display. The following indication also appears on the monitor.



Condensation warning indication

If this happens, the cassette is ejected automatically. Before resuming the operation, wait until the alarm message disappears, without turning the unit off.

## If the condensation warning appears immediately after powering on

Leave the unit powered on and wait until the indication disappears. While the indication is present, it is not possible to insert a cassette. Once the warning indication disappears, the unit is ready for use.

## Digital Hours Meter

The digital hours meter keeps a cumulative count of the total operating time, the drum rotation time, the tape transport operating time, and the number of threading and unthreading operations. These counts can be displayed on the monitor and time counter display, use them as guidelines for scheduling maintenance. Consult your Sony service representative about necessary periodic maintenance checks.

### Digital hours meter indications

The digital hours meter provides the following four display items.

#### T1: OPERATION

Cumulative total of hours unit is powered on, in units of 10 hours

#### T2: DRUM ROTATION

Cumulative total of hours of drum rotation with tape threaded, in units of 10 hours

#### T3: TAPE RUNNING

Cumulative total of hours of tape transport operation, in units of 10 hours

#### C1: THREADING

Cumulative number of tape threading/unthreading operation pairs, in units of 10 operation pairs

Except for the total operation time, there are two counts for each item: the cumulative total from manufacture, and a 'trip' count resettable.

### Displaying the digital hours meter

Press the HOURS METER button.

#### Monitor display

All four counts appear.

The four-digit value to the left of the slash is the resettable trip count, and the right value is the cumulative total from manufacture.

### Time counter display

One of the four indications appears. Use the [D] and [U] buttons to change the item displayed.

Initially, only the trip value appears. Press the [E] button to display the cumulative total to the right of the slash, as long as the button is held down.

Digital hours meter



Meter in screen

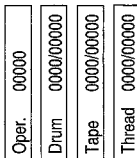
### Ending the digital hours meter display

Press the HOURS METER button.

### Resetting the trip values

Consult your Sony service representative.

Time counter display



## Head Cleaning

Clean both the video and audio heads using the special BCT-5CLN cleaning cassette. Follow the instructions for the cleaning cassette carefully, as improper use can damage the heads.

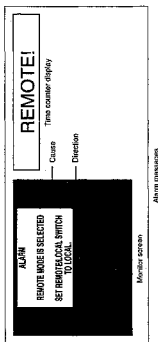
### Cleaning procedure

Insert the cleaning cassette, hold down the PLAY button and press the EJECT button. This carries out a five-second cleaning operation. The EJECT indicator flashes during this period, and all tape transport buttons other than the EJECT button are disabled.

### Notes

- Up to three consecutive cleaning operations are possible.
- Cleaning above this level may damage the heads.
- Be sure the unit is not left with the cleaning cassette in place, as this can cause damage to the heads.

There are a number of messages which may appear on the monitor screen during operation. (A message also appears in the time counter display.)



These alarm messages indicate misoperations or problems with the unit such as condensation on the drum.

To display these messages on the monitor screen, the monitor must be connected to the VIDEO 2 (SUPER OUTPUT) connector, and the CHARACTER switch on the auxiliary control panel must be in the ON position. It is possible to change the alarm messages in the menu system by setting the ALARM and REF. ALARM items to OFF.

For details of the menu settings see the section "Menu Operations" (page 7-8(E)).

If an alarm message is indicated, take appropriate action according to its contents.

## Chapter 9 Operational Problems

If an alarm message appears on the screen, or the unit appears to be malfunctioning, check this chapter before consulting your Sony service representative.

Alarm Messages	9-2 (E)
Trouble-Shooting Chart	9-4 (E)

# Trouble-Shooting Chart

The alarm messages indications are listed below.

Alarm messages		
Alarm messages on the monitor screen	Direction	Alarm messages in the time counter display
ABNORMAL SETTINGS DETECTED IN SETUP MENU.	SET ITEMS IN THE SETUP MENU TO THE APPROPRIATE VALUES. CONTACT YOUR DEALER IF THIS MESSAGE APPEARS ABOVE PROCEDURE.	IN SETUP !
MOISTURE HAS BEEN DETECTED.	KEEP THE POWER ON AND WAIT UNTIL THIS INDICATION GOES OFF.	HUMID !
REMOTE MODE IS SELECTED.	SET REMOTE/LOCAL SWITCH TO LOCAL.	REMOTE !
KEY IS JAMMED. CHECK THE FOLLOWING KEYS: (UP) (DOWN) (LEFT) (RIGHT) (STOP) (EJECT) (METER) (RESET)	—	Key short !
NO CASSETTE IN VTR.	—	No Cassette !
RECORD INHIBIT PLUG ON THE CASSETTE IS SET TO INHIBIT.	—	REC INH !
CTL MODE IS SELECTED.	SET CTL/FOCUS SWITCH TO CTL OFF.	CTL mode !
TO EXTENSIONAL IS SELECTED.	SET TO EXTENT SWITCH TO CTL INH.	TC EXT !
TCSS RUN MODE IS SET TO REC RUN.	SET TCSS RUN MODE (SETUP MENU) TO FREE RUN.	REC RUN !
REF VIDEO IS NOT DETECTED.	INPUT A REF VIDEO SIGNAL.	No REF !
A BLACK/WHITE SIGNAL IS BEING USED FOR REF VIDEO.	USE A COLOR SIGNAL.	BAW REF !
NON-STANDARD SIGNAL IS BEING USED FOR REF VIDEO.	USE A STANDARD SIGNAL.	REF NON-STD
INPUT VIDEO IS NOT DETECTED.	SUPPLY A VIDEO SIGNAL TO VIDEO INPUT.	No INPUT !

Tape problems		
Symptom	Cause	Remedy
Recording is not possible.	The record-inhibit plug on the cassette is pressed in <sup>a)</sup> .	Pull out the plug, or use a different tape.
Two tape transport controls (PLAY, F.WIND, REW buttons etc.) do not operate.	The REMOTE/LOCAL switch in the REMOTE position, and the LOCAL switch is pressed (STOP & EJECT or "ALL DISABLE").	Set the REMOTE/LOCAL switch to LOCAL or change the menu setting to "ALL ENABLE".
	No cassette is loaded <sup>a)</sup> .	Insert a cassette.

Time code problems		
Symptom	Cause	Remedy
It is not possible to preset the time counter display to an arbitrary value.	The TC IN selector switch is in the EXT position <sup>a)</sup> .	Set the TC IN selector switch to the INT position.
	The time counter selector switch is in the CTL position.	Set the time code selector switch to the LTC or U-BIT position. (It is not possible to preset time counter values.)
	The REMOTE/LOCAL switch in the REMOTE position, and the LOCAL switch is pressed (STOP & EJECT or "ALL DISABLE").	Set the REMOTE/LOCAL switch to LOCAL or change the menu setting to "ALL ENABLE".
Although the tape transport is operating, the time counter display value does not change.	The MENU button, TC PRESET button or HOURS/METER button has been pressed.	Press the button again, to exit from menu setting mode, time code presetting mode, or hours/meter mode may be. (In either of these modes, the time counter display does not show time counter information.)
	The time counter display is showing user bit data.	Set the time code selector switch to the LTC or CTL position.

a) In those states an alarm message appears both on the monitor screen and time counter display.

Monitor problems		
Symptom	Cause	Remedy
A "V" appears on the screen.	The TBC DELAY menu item is set to "VIDEO DELAY".	Set TBC DELAY to "SYNC DELAY". (The UWM sensor has a built-in time base corrector. Therefore, the video signal is delayed exactly 5 lines behind the reference signal. This means that when the TBC DELAY setting is "VIDEO DELAY", the video signal is delayed 10 lines behind the reference signal. However, even if the TBC DELAY item is set to "SYNC DELAY", if the monitor is synchronized to an external reference, a "V" also appears. This is not a malfunction.)
	A reference video signal is not input. The video signal is not input video signal is not synchronized to the reference signal.	Input a reference signal which is synchronized to the video signal and set the TBC DELAY to "REF". VIDEO INPUT connector on this unit is input through mode, and connect to the player REF. VIDEO INPUT. (In editing mode, the servo motor is not used. Therefore, the video signal and the input video signal and reference video signal are not synchronized, the time base corrector and the video signal are not synchronized. The picture will break up. According to this condition, however, it will not affect the quality of the recording.)
The time code (or other time counter indication) appears on the monitor is one frame behind.	The time code is being displayed in the top third of the screen.	Move the display position down. (When using a VTR avoid the top third of the screen. In the UWM mode, the video signal is delayed 10 lines behind the reference signal, and therefore even discontinuous time information such as user bit data can be displayed with the minimum delay. However, since the video signal is delayed 10 lines behind the reference signal, the beam is scanning the top third of the screen, the data from the previous frame appears if the time code is displayed within this area.)
The picture does not appear in video EE mode.	The connector to which the video signal is connected does not match the setting of the VIDEO IN selector switch.	Make the setting of the VIDEO IN selector switch match the video signal input. When inputting a component signal, also set the component input connector selection switch correctly.
No unsynchronized image appears on the monitor screen.	The CHARACTER switch is in the OFF position.	Set the CHARACTER switch to the ON position.
	The monitor is not connected to the VIDEO 1 (SUPER) or VIDEO 2 (SUPER) OUTPUT connector.	Connect the monitor to the VIDEO 2 (SUPER) OUTPUT connector. (When displaying video information, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector.)
The monitor screen is too bright.	The monitor INPUT connector 75 $\Omega$ termination switch is in the ON position, or there is no terminating device.	Set the monitor INPUT connector 75 $\Omega$ termination switch to the ON position, or connect a terminating device.
The monitor screen is too dark.	The 75 $\Omega$ termination of the video signal input is not connected.	Set the 75 $\Omega$ termination switch of the connector being used for a loop-through connection to the OFF position.
The video image is too dark when editing a composite video signal.	For example, when using the REF. VIDEO INPUT connector, the 75 $\Omega$ termination switch of the REF. VIDEO INPUT connector and the VIDEO INPUT connector are both set to the ON position.	Set the 75 $\Omega$ termination switch of the connector being used for a loop-through connection to the OFF position.

a) In this state an alarm message appears on the monitor screen and time counter display.

# Specification

## General

Power requirements	UVW-1800: 100 to 120 V AC, 50/60 Hz
Power consumption	UVW-1800P: 220 to 240 V AC, 50/60 Hz 85 W
Operating temperature	+5°C to +40°C (+41°F to +104°F)
Storage temperature	-20°C to +60°C (-4°F to +140°F)
Humidity	Less than 80%
Mass	19 kg (41 lb 12 oz)
External dimensions	427 mm (W) × 193 mm (H) × 474 mm (D) excluding external projections (16 3/4" × 7 5/8" × 18 5/8")

## Appendixes

Specification .....	A-2 (E)
Glossary .....	A-6 (E)

## Tape transport system

Tape speed	UVW-1800: 118.6 mm/s
Maximum recording/playback time	UVW-1800P: 101.5 mm/s
First forward/rewind time	UVW-1800: 90 minutes or longer (for BCT-90MLA) UVW-1800P: 100 minutes or longer (for BCT-90MLA)
Recommended cassettes	180 s or less (for BCT-90MLA) Retacam SP 1/2-inch cassette
Metal tapes:	BCT-50MA/10MA/20MA/30MA, UVWT-10MA/ 20MA/30MA BCT-50MLA/10MLA/20MLA/30MLA/60MLA/ 90MLA UVWT-60MLA/90MLA or equivalent

## Video system

Recording method	Luminance: Frequency modulation Chrominance: Time division/time compression chrominance frequency modulation
------------------	--

Metal tape	
Bandwidth	Luminance NTSC: 30 Hz to 4 MHz ± 0.0 dB/-4.0 dB PAL: 25 Hz to 3 MHz ± 0.0 dB/-4.0 dB
S/N ratio	Color difference (R-Y/B-Y) NTSC: 30 Hz to 1.5 MHz ± 0.0 dB/-4.0 dB PAL: 25 Hz to 1.5 MHz ± 0.0 dB/-4.0 dB
	Luminance (component INOUT) NTSC: 49 dB or more, PAL: 46 dB or more
Chrominance	NTSC: 44 dB or more, PAL: 38 dB or more
K factor (2T push)	PAL: 48 dB or more, PAL: 48 dB or more
V/C delay	3% or less 30 ms or less

## Audio System

Recording method	AC Bias	Meat tape
Frequency characteristics		50 Hz to 12.5 kHz, $\pm 0.0$ dB, $\pm 0.0$ dB
S/N ratio (at 3% distortion level for 100% modulation)		NTSC: 70 dB or more PAL: 60 dB or more
Weighted CCR 485-3 (for PAL)		1.5% or less
Distortion (THD) (at 1 kHz, reference level)		0.18% rms or less
Wow and flutter		0.18% rms or less

a) Peak level - 6 dB above operational level

## Processor adjustment range

## Main unit (UVW-1800/1800P)

System subcarrier phase 360° pp  
System sync phase  $\pm 300$  ns

## With BVR-5050P TBC remote control unit connected

Video level  $\pm 3$  dB  
Chrominance level  $\pm 3$  dB  
Black level UVW-1800: 0 to  $\pm 15$  IRE  
UVW-1800P: 0 to  $\pm 100$  mV  
System subcarrier phase 360° pp  
System sync phase  $\pm 100 \pm 2 \mu$ s (fine adjustment range 300 ns pp)  
V/C delay  $\pm 100$  ns

## Input connectors

<b>Video input</b> REF. VIDEO	BNC $\times 2$ (loop-through connection) Black burst or 1.0 Vp-p $\pm 0.3$ V, 75 $\Omega$ sync negative (286 mV for UVW-1800, 300 mV for UVW-1800P)
VIDEO	BNC $\times 2$ (loop-through connection) Composite video, 1.0 Vp-p, 75 $\Omega$ , sync negative 12-pin connector (male)
COMPONENT 1	Luminance: 1.0 Vp-p, 75 $\Omega$ , sync negative Chrominance: R-Y: 0.7 Vp-p, 75 $\Omega$ B-Y: 0.7 Vp-p, 75 $\Omega$
COMPONENT 2	BNC $\times 3$ Y: 1.0 Vp-p, 75 $\Omega$ , sync negative R-Y: 0.7 Vp-p, 75 $\Omega$ B-Y: 0.7 Vp-p, 75 $\Omega$
S-VIDEO	DIN 4-pin $\times 1$

**Audio Input**  
AUDIO CH 1/2  
XLR 3-pin  $\times 2$  (female)  
ON:  $\pm 4$  dBu, 600  $\Omega$ , balanced  
OFF:  $\pm 4$  dBu, 10 K $\Omega$ , balanced  
(0 dBu = 0.775 Vrms)

**TIME CODE IN**  
BNC  $\times 1$   
0.5 to 18 Vp-p, 600  $\Omega$ , unbalanced

## Output connectors

<b>Video output</b> VIDEO 1/2 (SUPER)	BNC $\times 2$ Composite video, 1.0 Vp-p, 75 $\Omega$ , sync negative (286 mV for UVW-1800, 300 mV for UVW-1800P) Switch selection on the subsidiary control panel controls whether time codes and other superimposed information are output from VIDEO 2 (SUPER) OUTPUT: 12-pin multi (female) Luminance: 1.0 Vp-p, 75 $\Omega$ , sync negative Chrominance: R-Y: 0.7 Vp-p, 75 $\Omega$ B-Y: 0.7 Vp-p, 75 $\Omega$
COMPONENT 1	BNC $\times 3$ Y: 1.0 Vp-p, 75 $\Omega$ , sync negative R-Y: 0.7 Vp-p, 75 $\Omega$ B-Y: 0.7 Vp-p, 75 $\Omega$
COMPONENT 2	DIN 4-pin $\times 1$
S-VIDEO	
<b>Audio output</b> AUDIO CH 1/2	XLR 3-pin $\times 2$ (male) $\pm 4$ dBu (600 $\Omega$ load), low impedance, balanced
MONITOR AUDIO	RCA pin jack $\times 1$
<b>TIME CODE OUT</b>	BNC $\times 1$ 2.2 Vp-p, 600 $\Omega$ , unbalanced

# Glossary

## HEADPHONES

Standard stereo jack  
Maximum -14 dBu, 8  $\Omega$   
(0 dBu = 0.775 Vrms)

## Remote connectors

TBC REMOTE: 15-pin multi x 1  
REMOTE: 9-pin multi x 1  
CONTROL S: stereo mini-jack x 1

## Supplied accessories

Power cord x 1  
9-pin remote control cable x 1  
Operating Instructions x 1

## Optional accessories

RAM-130 Rack Mount Adapter  
BCT-3CLN Cleaning Cassette  
BK-2062007 TBC Remote Control Unit  
BYR-2000P TBC Remote Control Unit  
VDC-CS 12-pin Dubbing Cable  
SVRM-100 Remote Control Unit

Design and specifications are subject to change without notice.

## A/B roll edit

An edit in which two or more players are used to create special effects such as dissolve and wipe, and one recorder is used to record the results of the edit. Using an editing controller allows efficient control of the VTRs and very precise editing.

## B-Y signal

A chrominance signal determined by subtracting the Y (luminance) signal from the B (blue) signal. One of the component signals.

## Bidding connection

A connection which allows a signal input to an input terminal to pass through the unit and exit from an output terminal as input to external equipment. Also called loop-through connection.

## Capstan

A drive mechanism that moves the tape at a specified speed. Its rotation normally synchronizes with a reference sync signal.

## Chrominance signal

Color signal containing color information such as hue and saturation. Also called C signal.

## Color frame

The color subcarrier phase, whose one cycle consists of two frames (four fields) in NTSC format and four frames (eight fields) in PAL format.

## Color framing

Maintenance of continuity in the color subcarrier phase between frames and fields, for the purpose of avoiding color on the picture.

## Component signal

A video signal consisting of a luminance signal (Y) and two chrominance signals (R-Y, B-Y).

## Composite signal

A composite video signal containing video, burst and sync signals.

## CTL

Abbreviation of control signal. A pulse signal recorded on a longitudinal track of the tape in units of fields. Counting this signal allows the number of frames to be used to find the tape running time. It is also used as a control signal to adjust the relationship between the scanning position of the video heads and tape movement during playback to match that during recording.

## Drop frame mode

In NTSC format, the actual number of frames per second is approximately 29.97, while that for the time code is specified as 30. Drop frame mode is a mode in which this time code is advanced in such a way that the difference in frame value between real time and the time codes is corrected. In this mode, two frames are skipped at the beginning of each minute, except for every tenth minute, so that the frame value for time codes matches that for real time.

## EE mode

Abbreviation of Electric to Electric mode. Video and audio signals are supplied to the VTRs internal circuits, but not to the recording heads.

## External synchronization

Synchronization of the signals and tape transport of a VTR with those of a reference VTR.

## IRE

A unit for expressing video level as determined by the Institute of Radio Engineers (now called the Institute of Electrical and Electronic Engineers).

## LING recording

Abbreviation of longitudinal recording. A method of recording audio signals by radio frequency bias method on the longitudinal track of the tape using the fixed head.

## LTC

Abbreviation of Longitudinal Time Code. A time code recorded in a separate track at the edge of the tape.



**Luminance signal**

The signal that determines the brightness of the picture. Also called Y signal. One of the component signals.

**Metal tape**

Magnetic tape coated with microscopic particles of metal deposited in a liquid binder. It allows high-density recording.

**Misture condensation**

Condensation of moisture on the tape transport mechanisms. If moisture condenses on the head-drum, the tape adheres to the drum and causes malfunction.

**Non-drop-frame mode**

A mode of advancing the time code in such a way that the difference in frame values between real time and the time code is neglected. Using this mode produces a difference of approximately 86 seconds per day between real time and time code, which is provided by the time code program in units of seconds using the number of frames as a reference.

**Oxide tape**

Magnetic tape coated with microscopic particles of ferric oxide dispersed in a liquid binder.

**R-Y signal**

A chrominance signal determined by subtracting the Y (luminance) signal from the R (red) signal. One of the component signals.

**Reference signal**

A video signal consisting of a sync signal or sync and burst signals, used as a reference.

**SMPT E**

Society of Motion Picture and Television Engineers.

**SN ratio**

Abbreviation of Signal-to-Noise ratio. The higher the SN ratio, the less noise and higher the picture quality.

**Search mode**

A VTR mode used when searching for specific scenes, by slewing the video output or time codes while playing back the tape at various speeds in forward or reverse direction.

**Servo lock**

Synchronizing the drum rotation phase and tape transport phase with a reference signal during playback and recording so that the video heads scan the tape in the same pattern during playback and recording.

**Superimpose**

To add a picture (or a set of characters) onto another so that both can be seen at the same time.

**S-video input connector**

A connector that inputs Y (luminance) and C (chrominance) signals separately to reduce interference between Y and C signals, and to help reproduce noiseless images.

**Sync signal**

A reference signal consisting of vertical and horizontal sync signals used for synchronizing the scanning patterns of the video camera and the monitor.

**TBC**

Abbreviation of Time Base Corrector. Electronic circuits to electrically stabilize the playback signals by removing color variation and roll in the playback picture caused by irregularity in drum rotation and tape movement. Time base correction reduces deterioration of picture quality when transmitting or copying playback signals.

**Time code**

Signals recorded on the tape to supply information on tape position such as the hour, minute, second, and frame number. Editing points or searching for particular scenes. There are two types of time code: LTC and VITC.

**Tracking**

Electrically controlling the video head so that the playback phase matches the recording phase of the tape. Especially when playing back the tape with a VTR other than the one used for recording, adjusting the tracking prevents noise from appearing on the picture.

**User bits**

Sections of the time code consisting of a total of 32 bits used for recording information such as the year, month and day, tape ID number or a program ID number.

**VBS**

Abbreviation of Video Burst and Sync. A composite signal consisting of video signal, burst signal and sync signal.

**VTC**

Abbreviation of Vertical Interval Time Code. The code recorded on a video signal track during the vertical blanking interval. It is used to be used during slow or still picture playback.

**V-blanking**

The portion of the video signal that occurs between the end of one field and the beginning of the next. During this time, the electron beams in the cameras and monitors are turned off so that they can return from the bottom of the screen to the top without showing traces of movement on the screen. When the position of Y-blanking is not adjusted correctly, a horizontal black bar appears on the screen.

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## <Extra operation>

Set MENU GRADE to ENHANCED. When S201-1 on the SS-53 Board is set to ON (CLOSE), "factory use" on SETUP MENU is displayed.

[factory use]

\* mark : factory setting

**PWR. ON UNTH :** When the power is turned on while the tape is left inside of the VTR, perform unthreading once and threading again. However, the unthreading operation is unable to be inhibited.

- \* ON : UNTHREAD once
- OFF : Do not UNTHREAD. The tape remains.

**REPEAT MODE :** The tape can be repeatedly played back using the time code, tape top/end or the unrecorded portion.

- \* OFF : Can not enter Repeat mode.
- ON : Enters Repeat mode.

**Note)** The alarm message is displayed when the power is turned on if the setting has been changed from the factory setting.

Turn this setting on and determine the necessary setting. Press the **PLAY** button to enter the repeat mode.

If normal editing operation is started while this setting is still on, the operations may not be performed correctly. Turn this setting off unless otherwise specified.

**REPEAT TOP :** Selection of the repeat starting point

- \* **TAPE TOP :** Starting point is the tape top.
- A POINT :** Starting point is when push the [SET] key and [←] key simultaneously or A PRESET point.

**REPEAT END :** Selection of the repeat ending point

- \* **VIDEO END :** Ending point is the termination point (unrecorded portion) of the video signal.
- TAPE END :** Ending point is the tape end.
- B POINT :** Ending point is set when the [SET] key and [→] key are pressed simultaneously, or set to the B PRESET point.

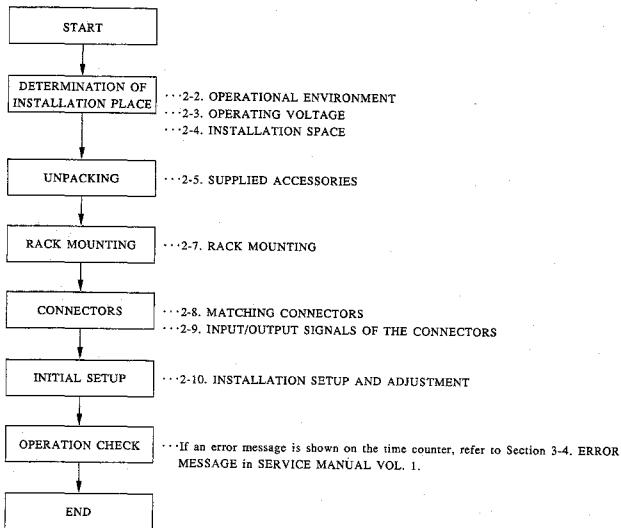
**A PRESET :** Set the time code data of the repeat starting point at discretion.

**B PRESET :** Set the time code data of the repeat ending point at discretion.

## SECTION 2 INSTALLATION

Be sure to install the UVW-1800P/1600P in location satisfying the required operational environment described below to assure the UVW-1800P/1600P superior performance and to maintain the excellent serviceability and accessibility.

### 2-1. INSTALLATION PROCEDURE



### 2-2. OPERATIONAL ENVIRONMENT

- Operating temperature : +5 °C to +40 °C
- Humidity : 80 % or less
- Storage temperature : -20 °C to +60 °C
- Locations to avoid
  - Areas where the unit will be exposed to direct sunlight or any other strong lights.
  - Dusty areas or areas where it is subject to vibration.
  - Areas with strong electric or magnetic fields.
  - Areas near heat sources.

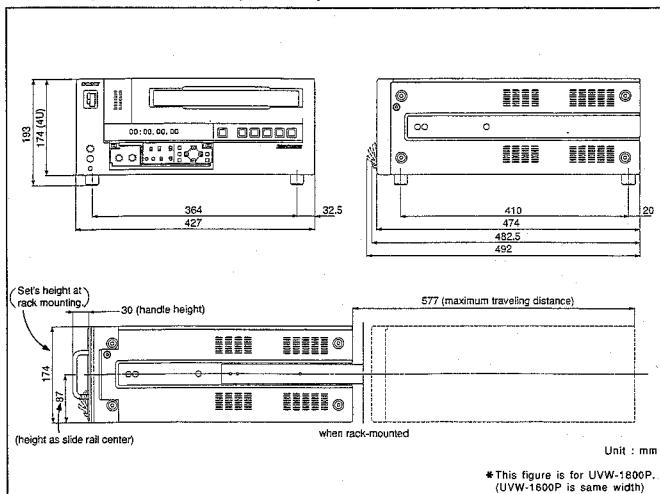
(Good air circulation is essential to prevent internal heat build-up. Place the unit in location with sufficient air circulation. Do not block the ventilation holes on the cabinet and the rear panel.)
- Horizontal condition : within ±30°

## 2-3. OPERATING VOLTAGE

- Power voltage : AC 220 to 240 V
- Power frequency : 50/60 Hz
- Power consumption : 85 W/UVW-1800P  
65 W/UVW-1600P

## 2-4. INSTALLATION SPACE

- (1) The rear side must be at least 40 cm away from the walls for ventilation and maintenance.
- (2) When the unit is operated on a desk or similar condition, assure that the clearance above the unit is at least 40 cm to provide accessibility to the printed circuit boards and other mechanical parts. Note that it is not necessary to provide the space when the unit is mounted in a rack since the printed circuit boards can be repaired after it is pulled out.



## 2-5. SUPPLIED ACCESSORIES

- AC power cord (1)
- RCC-5G 9-pin remote cable (1)
- Operation Manual (1)

## 2-6. OPTIONAL ACCESSORIES

- TBC remote control unit : BK-2007  
BVR-50P
- Rack mount Kit : RMM-130  
(The unit can be mounted in a 19-inch standard rack)
- 12-pin dubbing cable : VDC-CS
- Cleaning cassette tape : BCT-5CLN
- Remote control unit : SVRM-100
- S-video cable : YC-15V

## 2-7. RACK MOUNTING

The unit can be mounted in a 19-inch standard rack.  
It is recommended to use the following kit.

Rack Mount Kit : RMM-130 (optional accessory)

or

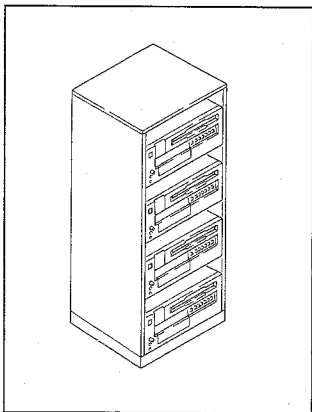
RACK-MOUNT SLIDES : MODEL 305

slide length 22 inch

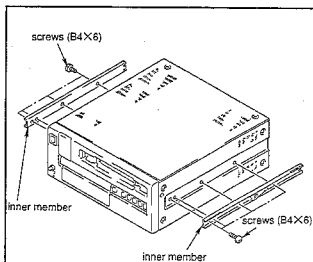
(ACCURIDE)

### Note for rack mounting :

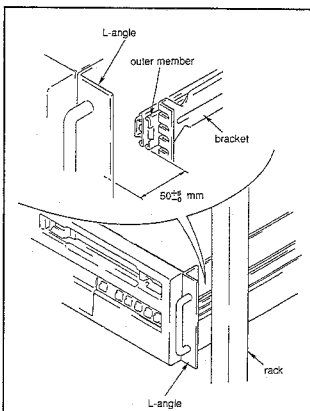
- When several VTRs are mounted in a rack, it is recommended to install a fan for ventilation. Good air circulation is essential to prevent internal heat build-up in a rack (5 °C to 40 °C must be met for all units).
- Never remove an upper panel and lower panel during rack mounting.
- Be sure to secure the rack to the floor to avoid accidents when a unit is pulled out.
- Connect long enough cables on the connector panel, considering that the unit is pulled out.
- This equipment can use with three tiers.  
But with four tiers and more, keep the spaces between the each VTRs in the rack 1 unit (about 44 mm) or more.



1. Remove the four screws on right and left side panels.  
And install the Inner Members of the rails to the right and left side panels with the screws removed.

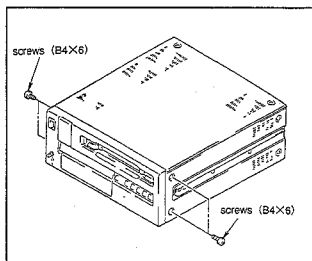


2. Install the Outer Member Brackets of the slide rails to the rack. Adjust the distance from the edge of the slide rail to the outside of the rack so that it meets the required specification.

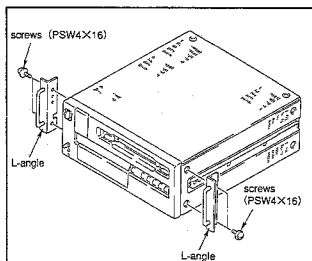




3. Remove the two screws (B4×6) on the right and left side panels. (Be careful not to lose these four screws.)



4. Install the L-angles to the holes described in step 3 with the supplied screws (PSW4×16) in RMM-130 for these L-angles.



**NOTE:** Never use screws PSW4×16 to install the right and left side panels without L-angles. Be sure to install the panels with the screws B4×6 removed in step 3. Screws for L-angles are longer than the side panels. Therefore, using the screws PSW4×16 may cause trouble in the unit.

## 2-8. MATCHING CONNECTORS

When external cables are connected to the connector on a connector panel during maintenance, the hardware listed below (or equivalents) must be used.

For UVW-1800P only	UVW-1800P/1600P side Connector	Matching Connector/Cable	
	Panel Indication	Connector/Cable	Sony Part No.
○	VIDEO INPUT		
	VIDEO	BNC, MALE	1-560-069-11
○	REF. VIDEO		
○	COMPONENT 2 (Y, R-Y, B-Y)		
○	COMPONENT 1	PLUG, 12P, FEMALE	1-562-159-00
○	S-VIDEO	YC-15V (1.5 m)	optional accessory
	VIDEO OUTPUT		
	1/2	BNC, MALE	1-560-069-11
	COMPONENT 2 (Y, R-Y, B-Y)		
	COMPONENT 1	PLUG, 12P, MALE	1-560-995-00
	S-VIDEO	YC-15V (1.5 m)	optional accessory
○	AUDIO INPUT		
	CH-1/CH-2	XLR, 3P, FEMALE	1-508-083-00
	AUDIO OUTPUT		
	CH-1/CH-2	XLR, 3P, MALE	1-508-084-00
	MONITOR		
	AUDIO	PIN PLUG	Standard Product
○	TIME CODE IN	BNC, MALE	1-560-069-11
	TIME CODE OUT	BNC, MALE	1-560-069-11
	TBC REMOTE	CONNECTOR, D-SUB 15P, FEMALE and JUNCTION SHELL, 15P	1-561-610-21  1-561-929-00
	REMOTE	CONNECTOR, D-SUB 9P, MALE and JUNCTION SHELL, 9P	1-560-651-00  1-561-749-00
		RCC-5G (5 m)	supplied accessory
		RCC-10G (10 m)	optional accessory
		RCC-30G (30 m)	

## 2-9. INPUT/OUTPUT SIGNALS OF THE CONNECTORS

### INPUT

REF VIDEO : BNC×2 (Bridging connection)  
Black burst or composite video 1.0 Vp-p, 75 Ω (ON/OFF), sync negative

VIDEO INPUT : BNC×2 (bridging connection).  
composite video, 1.0Vp-p, 75 Ω (ON/OFF), sync negative

COMPONENT 1 : Circular 12 pin (male)  
Y : 1.0 Vp-p, 75 Ω, sync negative  
R-Y : 0.7 Vp-p, 75 Ω  
B-Y : 0.7 Vp-p, 75 Ω

COMPONENT 2 : BNC×3  
Y : 1.0 Vp-p, 75 Ω, sync negative  
R-Y : 0.7 Vp-p, 75 Ω  
B-Y : 0.7 Vp-p, 75 Ω

S-VIDEO : Circular 4 pin  
Y : 1.0 Vp-p, 75 Ω, sync negative  
C : 0.30 Vp-p (burst level), 75 Ω

AUDIO INPUT CH-1/2 : XLR 3 pin×2  
+4 dBu, 600 Ω or 10 kΩ, balanced  
(0 dBu=0.775 Vrms)

TIME CODE IN : BNC  
0.5 V to 18 Vp-p, 10 kΩ, unbalanced

### OUTPUT

VIDEO OUTPUT 1/2 : BNC×2  
composite video, 1.0 Vp-p, 75 Ω, sync negative  
Superimposed time code etc. output from VIDEO OUTPUT 2, as specified by CHARACTER switch on a sub control panel.

COMPONENT 1 : Circular 12 pin (female)  
Y : 1.0 Vp-p, 75 Ω, sync negative  
R-Y : 0.7 Vp-p, 75 Ω  
B-Y : 0.7 Vp-p, 75 Ω

COMPONENT 2 : BNC×3  
Y : 1.0 Vp-p, 75 Ω, sync negative  
R-Y : 0.7 Vp-p, 75 Ω  
B-Y : 0.7 Vp-p, 75 Ω

S-VIDEO : Circular 4 pin  
Y : 1.0 Vp-p, 75 Ω, sync negative  
C : 0.30 Vp-p (burst level), 75 Ω

AUDIO OUTPUT CH-1/2 : XLR 3 pin×2  
+4 dBu (600 Ω load), low impedance, balanced  
(0 dBu=0.775 Vrms)

MONITOR AUDIO : PHONO JACK  
-6 dBu (47 kΩ load), unbalanced  
(0 dBu=0.775 Vrms)

TIME CODE OUT : BNC  
2.2 Vp-p, 600  $\Omega$ , unbalanced

HEADPHONES : Stereo phone jack  
-14 dBu max. (8  $\Omega$  load)  
(0 dBu=0.775 Vrms)

CONTROL S : Stereo mini jack

TBC REMOTE (D-SUB 15 pin : MALE)

<external view>



Pin No.	Input/Output Signal	Operating Voltage	IN/OUT
1	SYNC CONTROL	-5 to +5 V	IN
2	HUE CONTROL	-5 to +5 V	IN
3	SC CONTROL	-5 to +5 V	IN
4	VIDEO LEVEL CONTROL	-5 to +5 V	IN
5	SET UP CONTROL	-5 to +5 V	IN
6	CHROMA LEVEL CONTROL	-5 to +5 V	IN
7	-9 V	-9 V	OUT
8	GND	—	IN/OUT
9	FRAME GND	—	IN/OUT
10	—	—	—
11	—	—	—
12	—	—	—
13	Y/C DELAY CONTROL	-5 to +5 V	IN
14	—	—	—
15	+9 V	+9 V	OUT

REMOTE (D-SUB 9 pin : FEMALE)

<external view>



Pin No.	Controlling Device	Controlled Device
1	Frame Ground	Frame Ground
2	Receive A	Transmit A
3	Transmit B	Receive B
4	Transmit Common	Receive Common
5	—	—
6	Receive Common	Transmit Common
7	Receive B	Transmit B
8	Transmit A	Receive A
9	Frame Ground	Frame Ground

**S-VIDEO (Circular 4 Pin)**

Pin No.	Input/Output Signal
1	Y (G)
2	C (G)
3	Y (X)
4	C (X)

&lt;external view&gt;

**COMPONENT 1 IN (Circular 12 pin : MALE)**

Pin No.	Input/Output Signal
1	DUB Y IN (X)
2	DUB Y IN (G)
3	DUB R-Y IN (X)
4	DUB R-Y IN (G)
5	DUB B-Y IN (X)
6	DUB B-Y IN (G)
7	—
to	
12	

&lt;external view&gt;

**COMPONENT 1 OUT  
(Circular 12 pin : FEMALE)**

Pin No.	Input/Output Signal
1	DUB Y OUT (X)
2	DUB Y OUT (G)
3	DUB R-Y OUT (X)
4	DUB R-Y OUT (G)
5	DUB B-Y OUT (X)
6	DUB B-Y OUT (G)
7	—
8	—
9	DUB REF VIDEO IN (X)
10	DUB REF VIDEO IN (G)
11	—
12	—

&lt;external view&gt;



## 2-10. INSTALLATION SETUP AND ADJUSTMENT

### 2-10-1. Switch Settings on the Connector Panel and Sub Control Panel

When the unit is installed, be sure to perform the following setup and adjustment. If these adjustment is not performed, the unit may not operate properly.

Refer to the operation manual "Chapter 5 Editing" for setup and adjustment.

- |  |   |                           |
|--|---|---------------------------|
| (1) Audio input level switch setting                       | : 600 $\Omega$ ON/OFF<br>ON ; +4 dBu, 600 $\Omega$ , balanced<br>OFF ; +4 dBu, 10 k $\Omega$ , balanced   | } .....Connector<br>panel |
| (2) Component signal input connector select switch setting | : COMPONENT 1/2<br>1 ; Circular 12 pin<br>2 ; BNC   |                           |
| (3) 75 $\Omega$ termination switch setting                 | : REF VIDEO 75 $\Omega$ ON/OFF<br>INPUT VIDEO 75 $\Omega$ ON/OFF<br>ON ; When this unit is connected at the end of the line.<br>OFF ; When other unit is connected in series after this unit. |                           |
| (4) VIDEO INPUT select switch setting:                     | VIDEO IN Y-R, B/COMPOSITE/S VIDEO .....Sub control panel<br>Y-R, B ; Betacam component signal<br>COMPOSITE ; Ordinary video signal<br>S VIDEO ; Y/C separation type S Video signal            |                           |

Further, under the applications, perform the following setup and adjustment.

• In case of performing time code editing.

- (1) Time code reader mode setting
- (2) Time code generator mode setting

• In case of using as editing system.

- (1) Put the reference video signal to REF. VIDEO IN connector.
- (2) H system phase adjustment
- (3) SC system phase adjustment

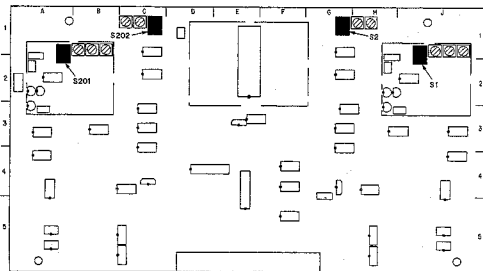
## 2-10-2. On-board Switch Setting

Only the four switches (S2/AP-31, S202/AP-31, S103/AR-14, S203/AR-14) marked by      in the following tables require setting in installation.

Do not make any attempt to alter the setting of the remaining switches except for servicing.

If the switch settings changed, perform fail to feature.

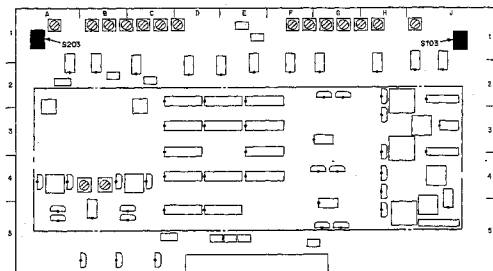
### AP-31 Board



Switch No.	Function	Description	FACTORY SETTING
S1	CH-1 AUDIO HEAD TUNE ADJ SW	The high frequency response characteristics (head tuning) of head amplifier is optimized by the combination of RV1 (S1) and RV201 (S201) for channel 1 and 2. Use them only in the audio head tuning adjustment. If the above switch setting is changed other mode, the audio frequency response characteristics is impaired.	Set to the position based on the adjustment condition.
S2	CH-2 AUDIO HEAD TUNE ADJ SW		

Switch No.		Function	Output Level (dBu)			Description
			+4	0	-6	
<u>S2</u>	1	CH-1 AUDIO OUTPUT REF.	OFF	ON	OFF	Selects the reference signal level of channel 1 output. Selects among +4 dBu, 0 dBu and -6 dBu.
	2	LEVEL SELECT SW	OFF	OFF	ON	
<u>S202</u>	1	CH-2 AUDIO OUTPUT REF.	OFF	ON	OFF	Selects the reference signal level of channel 2 output. Selects among +4 dBu, 0 dBu and -6 dBu.
	2	LEVEL SELECT SW	OFF	OFF	ON	
FACTORY SETTING		—	○			—

# AR-14 Board



Switch No.		Function	Input Level (dBu)			Description
			+4	0	-6	
S103	1	CH-1 AUDIO INPUT REF. LEVEL SELECT SW	OFF	ON	OFF	Selects the reference signal level of channel 1 input. Selects among +4 dBu, 0 dBu and -6 dBu.
	2		ON	OFF	OFF	
S203	1	CH-2 AUDIO INPUT REF. LEVEL SELECT SW	OFF	ON	OFF	Selects the reference signal level of channel 2 input. Selects among +4 dBu, 0 dBu and -6 dBu.
	2		ON	OFF	OFF	
FACTORY SETTING			○			

## NOTE: Setting the audio input/output level

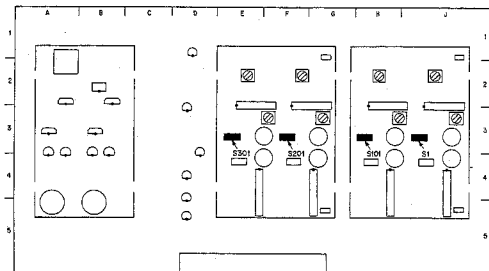
When connecting Sony VTR, Sony audio mixer "MTP series" or multiple UVW-1800P/1600Ps to each other, using XLR cables directly, select +4 dBu (factory default setting).

When connecting Sony VTR SVO-9600 series and others having the pin-jack type input/output connector, using XLR ↔ pin-jack conversion cable, select -6 dBu normally.

For more detail check the audio reference level of the equipment connected, and select for optimum setup.

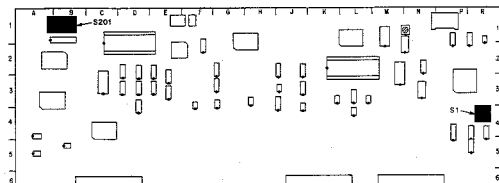


# RP-70 Board



Switch No.	Function	Description	FACTORY SETTING
S1	Y Ach REC CURRENT BYPASS SW	Set to OFF when a current probe or like is used for record current adjustment of Y signal channel-A (S1) and -B (S101).	ON
S101	Y Bch REC CURRENT BYPASS SW	After the adjustment is completed, this switch should be set to ON. Otherwise, this channel can not be recorded.	
S201	C Ach REC CURRENT BYPASS SW	Set to OFF when a current probe or like is used for record current adjustment of C signal channel-A (S201) and -B (S301).	
S301	C Bch REC CURRENT BYPASS SW	After the adjustment is completed, this switch should be set to ON. Otherwise, this channel can not be recorded.	

# SS-53 Board



Switch No.	Function	ON	OFF
S1	1	factory use	factory use
	2	SYSTEM	UVW-1800
	3	ID SW	for J
	4	NTSC	PAL

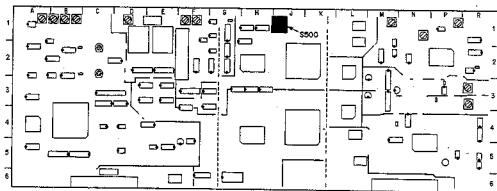
※ ☐ FACTORY SETTING

S1-2, S1-3, S1-4, is set to the position based on the unit.

If the first switch settings changed, perform fail to feature.

Switch No.	Function	Description	FACTORY SETTING
S201	1	Set this switch to ON (CLOSE) during several adjustment modes. It enables the following function changes. 1. "FACTORY USE" is displayed in the setup menu. The selected menu can be executed. 2. Search speed in LOCAL is changed. PLAY/F. FWD pressed simultaneously : FWD search×5 PLAY/REW pressed simultaneously : REW search×5 3. Tape speed in F.FWD/REW is displayed on the monitor. 4. VTR type is displayed on the time counter when power is turned on. (example : NTSC (I) EDITOR) 5. Hours meter can enter reset mode. 6. EEPROM can enter all reset mode. 7. Adjustment switches S500-1/TBC-25, S201/VRA-5 are validated.	OFF (OPEN)
	2	When this switch is turned ON (CLOSE), the audio noise reduction (NR) is forced to OFF.	
	3	factory use	
	4	When this switch is turned ON (CLOSE), tape protection like slack detection is inhibited. This function is used for mechanism and servo system alignment.	
	5	When this switch is turned ON (CLOSE), CTL signal detection is inhibited. This is used for head height adjustment and etc.	
	6	factory use	
	7	factory use	
	8	factory use	

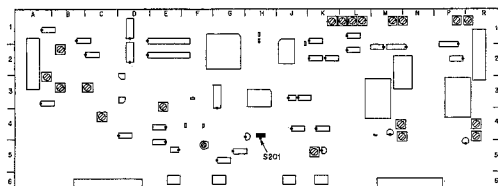
# **TBC-25 Board**



The switches S500-1 become valid only when S201-1/SS-53 is set to ON (CLOSE).

Switch No.	Function	FACTORY SETTING
S500	<p>1 LEVEL REF SW : Used for Y/C level adjustment. When this switch is set ON, the calibration signal having reference level is output. This signal is generated from internal data and used for calibrating the D/A and A/D level. Make sure to set this to off after adjustment.</p>	OFF
	<p>2 Y MUTE SW : Y signal is muted from the TBC output. When this switch is set ON, Y signal is muted in the all video outputs.</p>	
	<p>3 C MUTE SW : R-Y and B-Y signals are muted from the TBC output. When this switch is set ON, the R-Y and B-Y signals are muted in the COMPONENT 1 and 2 outputs. In addition only the chroma signal is muted in the COMPOSITE VIDEO OUT. (The color burst is not muted.)</p>	
	<p>4 No use</p>	

## VRA-5 Board



The switch S201 becomes valid only when S201-1/SS-53 (B-1) is set to ON (CLOSE).

Switch No.	Function	Description	FACTORY SETTING
S201	A/D LEVEL ADJ	Used for A/D level adjustment. When this switch is set ON, the calibration signal having reference level is output. This signal is generated from internal data and used for calibrating the A/D level. Set surely to off after adjustment.	OFF

### 2-10-3. When Connecting an Editor Controller

When an edit controller is connected, perform the edit controller setup as follows.

#### 1. RM-450CE

When UVW-1800P connected to RM-450CE recorder side, RM-450CE setup as follows.

- SYSTEM PRESET SWITCH  
LEFT SWITCH

7	6	5	4	3	2	1	0
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

- RIGHT SWITCH

7	6	5	4	3	2	1	0
ON	OFF	OFF	ON	OFF	OFF	OFF	OFF

- PREROLL SWITCH : 5 seconds
- SYNCHRO switch : ON
- 9/33 switch : 9 (RECORDER)
- TC/RTC/CTL switch : TC (RECORDER)

#### 2. BVE-600, BVE-900, BVE-910, BVE-2000

Open the edit controller setup menu and set the constant as follows.

For details of the setup menu operation, refer to the Operation Manual of the edit controller.

	CONSTANT-1								CONSTANT-2						
	1	2	3	4	5	6	7	8	1 (9)	2 (10)	3 (11)	4 (12)	5 (13)	6 (14)	7 (15)
UVW-1800P	21	51	00	55	05	05	02	84	0A	07	FB	00	80	2A	FF
UVW-1600P	21	50	00	55	05	05	02	84	0A	07	FB	00	80	2A	FF

**NOTE :** When the version of the edit controller software is what is shown below or higher, setting of the constant is not required.

- BVE-600 : V 1.07 and higher (S/N 10001-11000 for EK)  
V 2.02 and higher (S/N 20001 and Higher)
- BVE-900 : V 1.12 and higher  
(BKE-900K : V 2.11 and higher)
- BVE-910 : V 2.11 and higher
- BVE-2000 : V 1.20 and higher

#### 3. PVE-500

Because of automatic setup function, no setting is required in equipment connection.

#### **2-10-4. Precautions After Installation**

Observe the following precautions when this equipment is used in system setup.

- The REF. VIDEO INPUT requires video signal which complies with CCIR REP. 624.
- Adjust the sync phase of this equipment to the system sync with [SYNC] control on the sub control panel.
- Adjust the SCH phase of this equipment to the system SCH with [SC] control on the sub control panel.
- When a UVW-1800P is used as the recorder, it's require altering the TBC DELAY (SETUP MENU; in VIDEO CONTROL) setup with some switchers of the system.
- When this equipment is connected to the type of switcher that does not replace the sync signal, the SYNC/BURST level adjustment is required. (Refer Video Alignment Section.)


## [SETTING CHECK SHEET]

Write down the setup information (setup menu and switches on board) before starting to repair the equipment. Make useful this information to re-setup after repair.

In an editing room where system connection is frequently changed, copy this sheet and write the several types of setup. Use of this sheet is recommended.

- Setup menu information can be saved separately from record area in this equipment. But some repair can lose the saved information. This sheet is effective for the backup.

### SUB CONTROL PANEL

VIDEO IN ☐ Y-R, B ☐ COMPOSITE ☐ S VIDEO (for 1800P)  
 REMOTE/LOCAL ☐ REMOTE ☐ LOCAL  
 CTL/LTC/U-BIT ☐ CTL ☐ LTC ☐ U-BIT  
 CHARACTER ☐ ON ☐ OFF  
 TC IN INT/EXT ☐ INT ☐ EXT (for 1800P)  
 CH1 REC VOL 0 2 4 6 8 10 (for 1800P)  
 CH2 REC VOL 0 2 4 6 8 10 (for 1800P)  
 HEADPHONES 

### CONNECTOR PANEL

AUDIO INPUT CH-1 600  $\Omega$  ☐ ON ☐ OFF (for 1800P)  
 AUDIO INPUT CH-2 600  $\Omega$  ☐ ON ☐ OFF (for 1800P)  
 REF. VIDEO INPUT 75  $\Omega$  ☐ ON ☐ OFF  
 VIDEO INPUT 75  $\Omega$  ☐ ON ☐ OFF (for 1800P)  
 COMPONENT1/COMPONENT2 ☐ COMPONENT1 ☐ COMPONENT2 (for 1800P)

### SETUP MENU

Menu Level 1	Menu Level 2/3		Factory Setting	Setting
OPERATIONAL FUNCTION	AUTO EE SELECT	CASSETTE OUT	EE	
		F. FWD/REW	PB	
		STOP	PB	
		STANDBY OFF	PB	
	LOCAL ENABLE		STOP & EJECT	
	MAX SRCH SPEED		$\times 16$	
	AUTO REW		ENABLE	
	PREROLL TIME		5 SEC	
	AFTER CUE-UP		STOP	
	CUT-IN FIELD		1ST FIELD	
	PLAY START		4 FRAME DELAY	

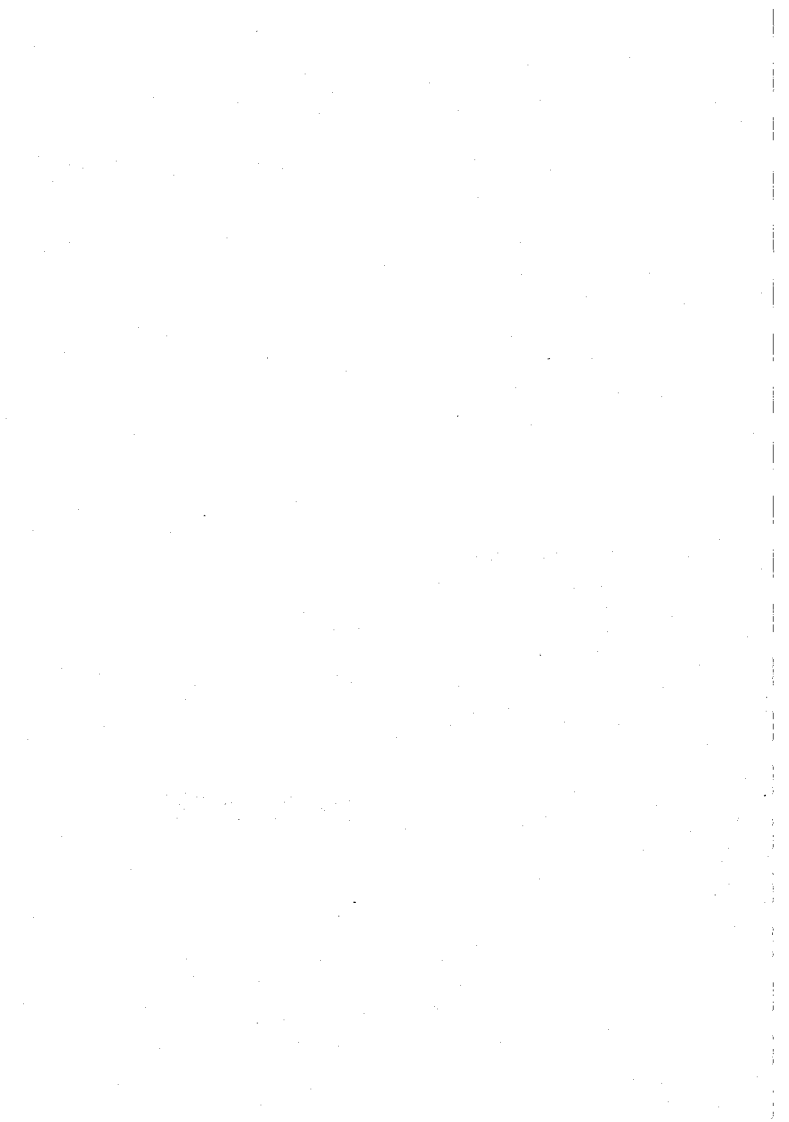
Menu Level 1	Menu Level 2/3		Factory setting	Setting
DISPLAY CONTROL	CHARA. POSITION			
	CHARA. TYPE		WHITE (with BKGD)	
	DISPLAY INFO		TIME DATA & STATUS	
	PEAK HOLD		OFF	
	BRIGHTNESS		100 %	
	ALARM		ON	
	REF. ALARM		ON (LIMITED) : 1800 OFF : 1600	
TIME CODE	RUN MODE		FREE RUN	
	UB BINARY GP		00 : NOT SPECIFIED	
	PHASE CORR.		OFF	
	CF FLAG		OFF	
TAPE PROTECTION	FROM STOP	STOP TIMER	8 MIN	
		NEXT MODE	STANDBY OFF	
	FROM STILL	STILL TIMER	8 MIN	
		NEXT MODE	STEP FWD	
VIDEO CONTROL	TBC DELAY		SYNC DELAY	
	BLANKING LINE	09,322 LINE	MASK	
		10,323 LINE		
		11,324 LINE		
		12,325 LINE		
		13,326 LINE		
		14,327 LINE		
		15,328 LINE		
		16,329 LINE		
		17,330 LINE		
		18,331 LINE		
		19,332 LINE		
		20,333 LINE		
		21,334 LINE		
	22,335 LINE			
	23,336 LINE	HALF		
	BLANKING DECODE	09,322 LINE	BLACK & WHITE	
		10,323 LINE		
		11,324 LINE		
		12,325 LINE		
		13,326 LINE		
		14,327 LINE		
		15,328 LINE		
		16,329 LINE		
		17,330 LINE		
		18,331 LINE		
		19,332 LINE		
		20,333 LINE		
21,334 LINE				
22,335 LINE				



Menu Level 1	Menu Level 2/3	Factory setting	Setting
factory use	PWR. ON UNTH	ON	
	REPEAT MODE	OFF	
	REPEAT TOP	TAPE TOP	
	REPEAT END	VIDEO END	
	A PRESET	00 : 00 : 00 : 00	
	B PRESET	00 : 00 : 00 : 00	
MENU GRADE		BASIC	

## SWITCH ON BOARD

Board	Switch	Factory Setting	Setting
AP-31 board	S1 : CH-1 AUDIO HEAD TUNE ADJ SW	Dependent on adjustment	
	S2 : CH-1 AUDIO OUTPUT REF. LEVEL SELECT SW	All OFF	
	S201 : CH-2 AUDIO HEAD TUNE ADJ SW	Dependent on adjustment	
	S202 : CH-2 AUDIO OUTPUT REF. LEVEL SELECT SW	All OFF	
AR-14 board	S103 : CH-1 AUDIO INPUT REF. LEVEL SELECT SW	S103-1 : OFF S103-2 : ON	
	S203 : CH-2 AUDIO INPUT REF. LEVEL SELECT SW	S203-1 : OFF S203-2 : ON	
RP-70 board	S1 : Y Ach REC CURRENT BYPASS SW	ON	
	S101 : Y Beh REC CURRENT BYPASS SW	ON	
	S201 : C Ach REC CURRENT BYPASS SW	ON	
	S301 : C Beh REC CURRENT BYPASS SW	ON	
SS-53 board	S1 : SYSTEM ID SW	Dependent on model	
	S201 : SYSTEM DIP SW	OFF (OPEN)	
TBC-25 board	S500-1 : LEVEL REF SW	OFF	
	S500-2 : Y MUTE SW	OFF	
	S500-3 : C MUTE SW	OFF	
	S500-4 : No use	OFF	
VRA-5 board	S201 : A/D LEVEL ADJ	OFF	



## SECTION 3 SERVICE OVERVIEW

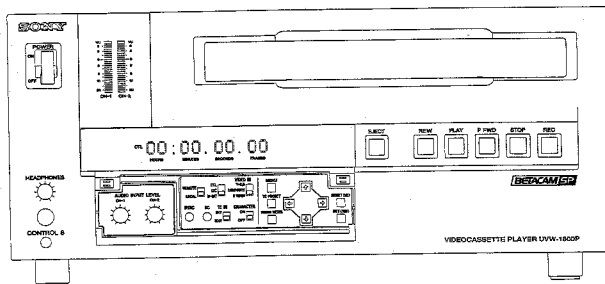
### 3-1. FUNCTION COMPARISON

UVW-1800P is a video cassette recorder.

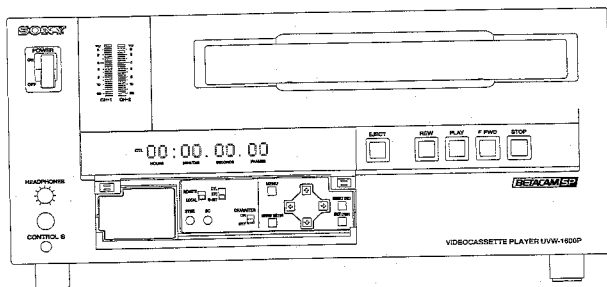
UVW-1600P is a video cassette player.

Front panels of these units are as follows:

#### • Uvw-1800P

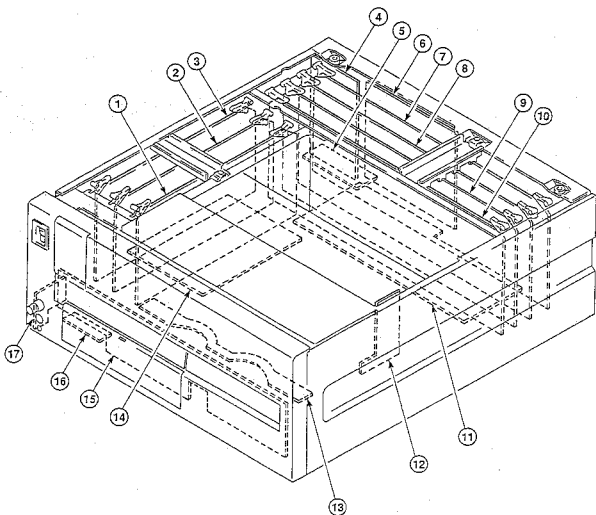


#### • Uvw-1600P

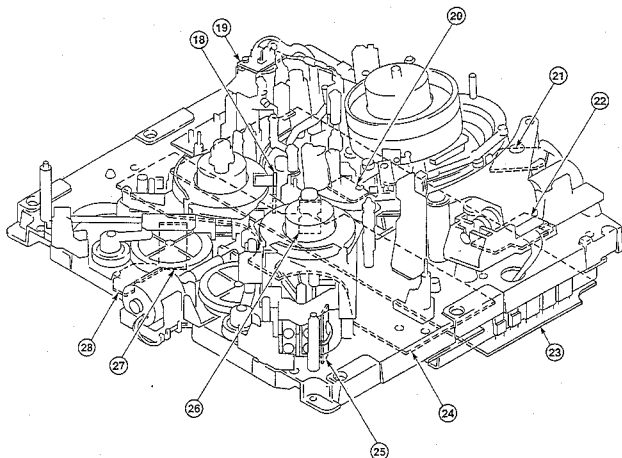


## 3-2. MAIN PARTS LOCATION

### 3-2-1. Location of the Printed Circuit Board



- |   |   |   |
|---|---|---|
| ① RP-70P Board (UVW-1800P)<br>RP-70AP Board (UVW-1600P)   | ⑥ CP-225 Board (UVW-1800P)<br>CP-225A Board (UVW-1600P)   | ⑫ CL-25 Board (Cassette compartment)                    |
| ② AP-31P Board (UVW-1800P)<br>AP-31AP Board (UVW-1600P)   | ⑦ VRA-5P Board (UVW-1800P)                                | ⑬ PC-62 Board (Cassette compartment)                    |
| ③ AR-14P Board (UVW-1800P)                                | ⑧ VP-43P Board (UVW-1800P)<br>VP-43AP Board (UVW-1600P)   | ⑭ MB-471 Board (UVW-1800P)<br>MB-471A Board (UVW-1600P) |
| ④ CP-226P Board (UVW-1800P)<br>CP-226AP Board (UVW-1600P) | ⑨ TBC-25P Board   | ⑮ KY-249 Board (UVW-1800P)<br>KY-249A Board (UVW-1600P) |
| ⑤ CP-237P Board (UVW-1800P)<br>CP-237AP Board (UVW-1600P) | ⑩ SS-53 Board   | ⑯ VR-155 Board (UVW-1800P)                              |
|   | ⑪ MB-470P Board (UVW-1800P)<br>MB-470AP Board (UVW-1600P) | ⑰ HP-61 Board (UVW-1800P)<br>HP-61A Board (UVW-1600P)   |



- ⑮ SE-207 Board (Supply side)
- ⑮ PD-35 Board
- ⑳ TR-84 Board
- ㉑ PTC-68 Board
- ㉒ PTC-67 Board
- ㉓ DR-214 Board

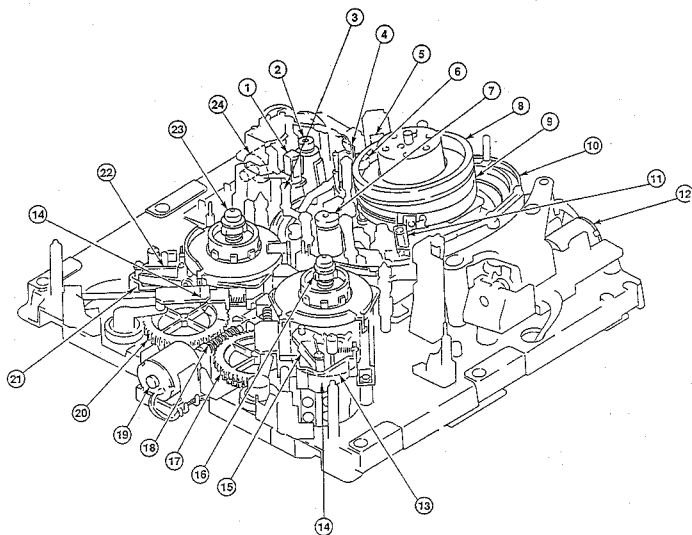
- ㉔ MS-39 Board (UVW-1800P)
- MS-39A Board (UVW-1600P)
- ㉕ RM-127 Board (Take-up side)
- ㉖ SE-207 Board
- ㉗ RM-126 Board (Supply side)
- ㉘ PTC-66 Board

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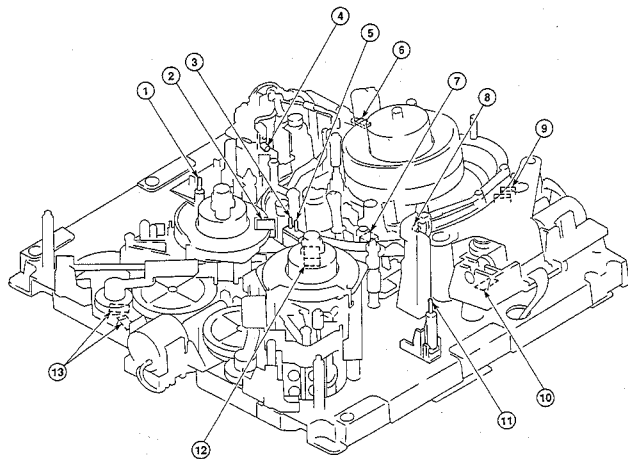
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### 3-2-2. Location of the Main Mechanical Parts/Components



- |  |                         |
|--|-------------------------|
| ① Full erase head assembly/Tape cleaner assembly | ⑬ Reel motor            |
| ② Capstan motor                                  | ⑭ RS table (T) assembly |
| ③ Tension regulator arm                          | ⑮ T break assembly      |
| ④ CTL head                                       | ⑯ T reel table assembly |
| ⑤ Audio/TC head                                  | ⑰ T worm wheel          |
| ⑥ Cleaning roller                                | ⑱ Worm gear (LS motor)  |
| ⑦ Pinch roller assembly                          | ⑲ Reel position motor   |
| ⑧ Upper drum assembly                            | ⑳ S worm wheel          |
| ⑨ Drum assembly                                  | ㉑ RS table (s) assembly |
| ⑩ Loading ring assembly                          | ㉒ S break assembly      |
| ⑪ AT cleaner                                     | ㉓ S reel table assembly |
| ⑫ Gear box motor                                 | ㉔ Pinch solenoid        |

### 3-2-3. Location of the Sensor (1)



#### ① S cassette Miss-REC sensor

This is a record-inhibit sensor for the small cassette of a metal particle tape.

#### ② S reel rotation detection sensor

The S reel rotation detection sensor detects the rotation of the S reel table.

The FG output signal of this sensor inputs to the servo circuit, and controls the rotation speed and torque of the reel motor.

#### ③ Reel hub diameter detection sensor

The reel hub diameter varies depending on the length of the tape wound on a cassette tape. The reel hub diameter detection sensor detects the reel hub diameter using a tab on the back side of the cassette tape.

The output signal of this sensor inputs to the servo circuit, and controls the rotation speed and torque of the reel motor.

#### ④ Tape end sensor

During tape travelling in the FWD direction, the tape end sensor detects the end of tape.

#### ⑤ Oxide tape/metal particle tape detection sensor

This sensor detects whether an oxide tape or metal particle tape is being inserted to the unit using a tab on the back side of the cassette tape.

#### ⑥ Condensation sensor

This sensor detects whether moisture condensation occurs in the unit or not.

#### ⑦ Tension sensor

During recording or playback, the S tension regulator arm activates to maintain constant tape tension. The tension sensor detects the position of the tension regulator arm.

#### ⑧ Tape beginning sensor

During tape travelling in the FWD direction, the tape beginning sensor detects the beginning of tape.

#### ⑨ Threading-end/unthreading-end detection sensor

This sensor detects whether the loading ring is the threading-end or unthreading-end position.

#### ⑩ Gear box motor rotation detection sensor

The gear box motor rotation detection sensor detects the rotation speed of the gear box motor.

The FG output signal of this sensor inputs to the servo circuit, and controls the threading speed to protect the tape from the excessive tension.

#### ⑪ L cassette Miss-REC sensor (For metal particle tape).

This is a record-inhibit sensor for the large cassette of metal particle tape.

#### ⑫ T reel rotation detection sensor

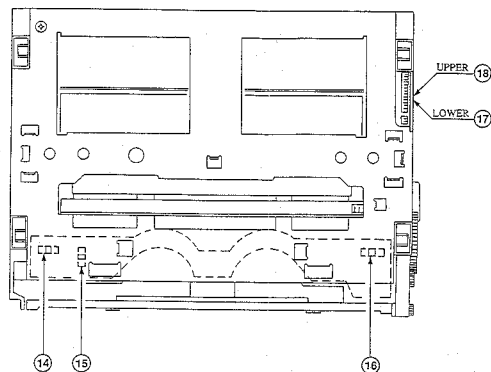
The T reel rotation detection sensor detects the rotation of the T reel table.

The FG output signal of this sensor inputs to the servo circuit, and controls the rotation speed and torque of the reel motor.

#### ⑬ Reel L/S position sensor

This sensor detects whether the reel table is the correct position according to the size of the inserted cassette tape.

### 3-2-4. Location of the Sensor (2) ..... Cassette Compartment



#### ⑭ Cassette-in sensor (L)

This sensor detects whether a cassette is being inserted.

#### ⑮ Cassette L/S size detection sensor

This sensor detects whether the inserted cassette tape is an L size or S size.

#### ⑯ Cassette-in sensor (R)

This sensor detects whether a cassette is being inserted.

#### ⑰ Cassette-down (2) sensor

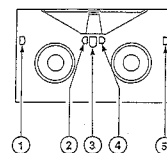
#### ⑱ Cassette-down (1) sensor

The (1) and (2) sensor detects the position of the cassette compartment by using the combination of ON/OFF operation of these sensors and cassette-in sensor.

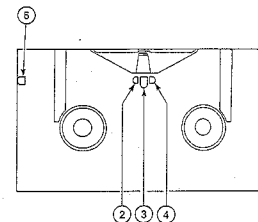
### 3-3. FUNCTION OF THE CASSETTE PLUG AND TAB

As shown in the figure below, plugs and tabs are provided at the back side of cassette tape.

S Cassette



L Cassette



#### ① S cassette Miss-REC tab (for oxide tape) (Note 1)

#### ② Video tape thickness detection tab (for oxide tape) (Note 2)

#### ③ Oxide/metal particle tape detection tab (Note 3)

#### ④ Reel hub diameter detection tab

#### ⑤ S cassette Miss-REC plug (for metal particle tape)

#### ⑥ L cassette Miss-REC plug

(Note 1) An oxide tape cannot be used for this VTR.

(Note 2) All metal particle tapes have a detection tab, because video tape thickness is one type.

(Note 3) Because of Note 1, if it detects an oxide tape, "TAPE" on and off on the display window on the front panel and displays that an unserviceable tape is loaded. And eject the cassette tape automatically.

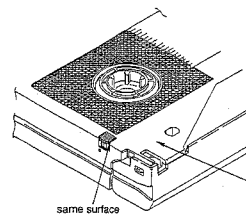


Fig. 1

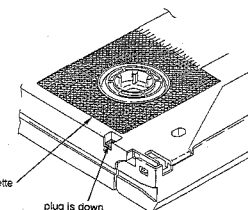


Fig. 2



The presence or absence of these plugs and tabs determines the cassette status as shown in the table below.

Plug and tab	Cassette status with plugs and tabs	Cassette status without plugs and tabs
S cassette Miss-REC tab (for oxide tape)	Cannot be used	
S cassette Miss-REC plug (for metal particle tape)	can be recorded (refer to Fig. 1)	cannot be recorded (refer to Fig. 2)
L cassette Miss-REC plug	can be recorded (refer to Fig. 1)	cannot be recorded (refer to Fig. 2)
Tape thickness detection tab	A 20 $\mu\text{m}$ thick tape is wound on the cassette.	A 15 $\mu\text{m}$ thick tape is wound on the cassette.
Oxide/metal particle tape detection tab.	An oxide tape is wound on the cassette.	A metal particle tape is wound on the cassette. (Note 3)
Reel hub diameter detection tab	For small hub	For large hub

### 3-4. ERROR MESSAGE

#### 3-4-1. Alarm

This unit features an alarm display function.

When a problem is detected, an alarm is displayed immediately in the time counter display on the control panel and an alarm and the message are displayed on the video monitor.

To display alarm and the message on the video monitor, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the sub control panel must be set to ON.

This unit features two types of alarms. One is for operators, and the other is for service persons.

This manual shows alarms only for service persons.

As for operators, refer to operation manual or overview in this manual.

Activating alarm display may influence to the system. For example, when the reference video signal is not used.

Therefore, you can select whether or not to display the alarm from the Setup menu.

However, alarms for service persons are displayed regardless of Setup menu selection.

##### 1. Alarms will be displayed as soon as power is turned on.

Detection : Checks the settings of switch S1 on the SS-53 board and the contents of electrically erasable/programmable ROM (EEPROM).

Operation after detection

: None

Display : Displays until any button is pressed.



Detection : Checks the version of Setup menu.

Operation after detection

: Setup menu is operated at factory setting. The contents of electrically erasable/programmable ROM (EEPROM) are not changed. Therefore, if the Setup menu is not reset, the same alarm will be displayed when the power is turned on.

Display : Displays until any button is pressed.

ALARM

THE SETUP MENU SOFTWARE  
HAS BEEN UPGRADED.

SET THE SETUP MENU ITEMS  
TO DESIRED SETTINGS OR  
ACTIVATE THE 'LOAD MENU  
DATA' (MAINTENANCE MENU)  
FUNCTION.

MENU Ver. UP

Detection : Sets switch S201 on the SS-53 board to ON.

Operation after detection

: None

Display : Displays until any button is pressed.

ALARM

THE UNIT IS IN  
ADJUSTMENT MODE.

SET THE SWITCHES OF S201  
ON BOARD SS-53 TO OFF.

ADJ. mode!

Detection : FACTORY USE of Setup menu is changed.

Operation after detection

: None

Display : Displays until any button is pressed.

ALARM .

SELECTIONS OF THE SETUP  
MENU'S 'FACTORY USE'  
ITEMS HAVE BEEN CHANGED.

SET THESE ITEMS TO  
FACTORY PRESET VALUES.

FACT. USE!

### 3-4.2. Error Code

This unit features the self-diagnostics to detect any problem. When a problem is detected, an error code is displayed immediately in the time counter display on the control panel and an error code and message are displayed on the video monitor.

To display error code and message on the video monitor, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the sub control panel must be set to ON.

**NOTE :** Indicates the error code number inspite of XX-XXX on the video monitor.

After any problem is detected, some of error codes enter the unit to AUTO OFF.

(Refer to the tables as shown in page 3-18 and later. However, error code 08-032 is excluded.)

Therefore, when turning off the power once and then turning on, the error code or error code and message are displayed on the time counter or video monitor.

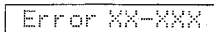
Then, the unit enters to AUTO OFF mode again.

In AUTO OFF mode, press the EJECT key. The unit enters the emergency EJECT mode.

The emergency EJECT mode refers to the mode in which the tape is gently ejected with the available motors under the assumption that a tape slack or device related problem has occurred.

When the unit enters the EJECT mode, the following messages are displayed on the video monitor.

On the time counter, error code is displayed.



When a cassette tape is removed with the emergency EJECT mode, the following messages are displayed on the video monitor. On the time counter, error code is displayed.

ERROR  
AN ERROR HAS BEEN  
DETECTED. INFORM SERVICE  
OF FOLLOWING CODE:  
XX-XXX  
PRESS EJECT KEY  
TO EJECT TAPE.

When a cassette tape cannot be removed with the emergency EJECT mode, the following messages are displayed on the video monitor.

On the time counter, error code is displayed.

ERROR  
TAPE CANNOT BE EJECTED.  
INFORM SERVICE  
OF FOLLOWING CODE:  
XX-XXX

When a cassette tape cannot be removed with the emergency EJECT mode, perform section 3-12.

## 1. Main code and sub code

### • Main code

Main code is shown by two digits which indicates the system where the problem occurred.

Main code 0X : Servo and tape path systems problem

Main code 2X : Mechanical control system problem

Main code 3X : Sensors problem

Main code 9X : Communication and interface systems problem

### • Sub code

Sub code is shown in three digits. Each digit has the following meanings.

When the main code is 0X or 2X:

X      X      X

3rd digit : Symptom

2nd digit : Device in which the problem is detected

1st digit : Mode in which the problem is detected

1st digit : Mode in which the problem is detected

0 : Mode cannot be determined. Or, determination of mode is necessary.

1 : Cassette-down mode

2 : Threading mode

3 : STOP mode

4 : F. FWD or REW mode

5 : SEARCH mode

6 : PLAY or REC mode

7 : STANDBY-OFF mode

8 : Unthreading mode

9 : Cassette-up mode

10 : Cassette-out mode

(A cassette tape is removed.)

2nd digit : Device in which the problem is detected

0 : Device cannot be determined. Or, determination of device is not necessary.

1 : Cassette up/down motor, or cassette up/down sensor

2 : Threading motor, FG or sensor

3 : Drum motor or FG

4 : Capstan motor or FG

5 : S reel motor or FG

6 : S reel brake solenoid

7 : T reel motor or FG

8 : T reel brake solenoid

9 : S/T reel motor or FG

A : Tension regulator

B : Pinch solenoid

C : Reel position motor or sensor

3rd digit : Symptom

0 : Determination of mode is not necessary.

1 : Operation cannot be completed within specified time.

2 : Detects that the speed is not normal.

3 : Detects the slack of the tape.

4 : FG cannot be detected.

5 : Detects FG.

6 : Detects the rotation is not normal.

7 : Detects the maximum tension.

8 : Detects the current is not normal.

9 : Full top or end cannot be released.

A : Retry (Once, unthreading, and then threading.)

When the main code is 3X:

The sub code of main code 3X is 000.

When the main code is 9X:

X      X      X  
|      |      |  
         3rd digit : Symptom  
         2nd digit : CPU (u-COM) or IC of the connected device  
1st digit : CPU (u-COM) or IC in which the problem is detected

1st and 2nd digits : CPU (u-COM) code

- 1 : System control main CPU
- 2 : Keyboard u-COM
- 3 : EEPROM
- 4 : Servo main CPU
- 5 : Servo sub u-COM
- 6 : TBC u-COM

3rd digit : Symptom


- 1 : Check sum problem
- 2 : Over-running problem
- 3 : Parity problem
- 4 : Framing problem
- 5 : Interface cannot be completed within the specified time.
- 6 : Servo adjustment data on EEPROM problem
- 7 : Setup menu on EEPROM problem
- 8 : Hours meter on EEPROM problem

## 2. How to display the error codes that were previously detected



This unit memorizes the error code in electrically erasable/programmable ROM (EEPROM) when an internal problem is detected. (However, error code 9X-XXX is excluded.)


The error codes of the detected problems are displayed.

The procedures of displaying the error codes are as follows:

1. Press the MENU button while pressing the  button.






2. Set the cursor to SERVICE SUPPORT with the  or  button.




Then, press the  button.





3. Set the cursor to ERROR LOG with the  or  button.  
Then, press the  button.



4. Set the cursor to the desired error code with the  or  button.  
Then, press the  button.



5. Press the SET (YES) button.




6. Press the MENU button. The display will return to Step 3.




### 3. How to look up an error code in this unit

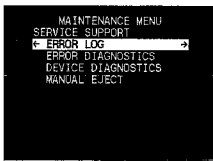
This unit features a dictionary function to look up an error code.




The procedures for looking up an error code are as follows:

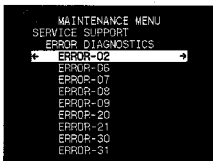
1. Press the MENU button while pressing the  button.






2. Set the cursor to SERVICE SUPPORT with the  or  button.  
Then, press the  button.






3. Set the cursor to ERROR DIAGNOSTICS with the  or  button.  
Then, press the  button.



4. Set the cursor to the error main code you wish to search with the  or  button.  
Then, press the  button.



5. Set the cursor to the error code you wish to search with the  or  button.  
Then, press the  button.



6. Press the SET (YES) button.



7. Press the MENU button. The display will return to Step 4.

#### 4. Error code

- Main code 0X : Servo system or tape path system problem

##### ① Main code 02

Sub code	Detection	Operation after detection	Valid mode	Display
058	It is detected that the current of the S reel motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	
078	It is detected that the current of the T reel motor is not normal.			
154	The S reel FG cannot be detected by FG check when inserting a cassette tape.	Removes cassette tape automatically.	—	Displays until pressing any button or until inserting a cassette tape again.
174	The T reel FG cannot be detected by FG check when inserting a cassette tape.			
194	Neither S reel FG nor T reel FG can be detected by FG check when inserting a cassette tape.			
255	The S reel FG is detected in threading.	AUTO OFF	EJECT (Emergency EJECT)	
274	The T reel FG cannot be detected in threading.			
355	The S reel FG is detected in STOP or STILL mode.			
375	The T reel FG is detected in STOP or STILL mode.			
395	The S reel FG and T reel FG are detected in STOP or STILL mode.			
402	It is detected that the tape does not run at the specified speed in F. FWD or REW mode.	STOP	Error is remedied, then the unit operates normally.	Displays until pressing any button.
403	The slack of the tape is detected in F. FWD or REW mode.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
454	The S reel FG cannot be detected in F. FWD or REW mode.			
474	The T reel FG cannot be detected in F. FWD or REW mode.			
494	Neither S reel FG nor T reel FG can be detected in F. FWD or REW mode.			
496	It is detected that the rotations of S and T reel are not normal in F. FWD or REW mode.			
503	The slack of the tape is detected in SEARCH mode.			
554	The S reel FG cannot be detected in SEARCH mode.			
574	The T reel FG cannot be detected in SEARCH mode.			

Sub code	Detection	Operation after detection	Valid mode	Display
594	Neither S reel FG nor T reel FG can be detected in SEARCH mode.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
596	It is detected that the rotations of S and T reel are not normal in SEARCH mode.			
603	The slack of the tape is detected in PLAY or REC mode.			
654	The S reel FG cannot be detected in PLAY or REC mode.			
674	The T reel FG cannot be detected in PLAY or REC mode.			
694	Neither S reel FG nor T reel FG can be detected in PLAY or REC mode.			
696	It is detected that the rotations of S reel and T reel are not normal in PLAY or REC mode.			
803	The slack of the tape is detected when unthreading.			
855	The S reel FG is detected when unthreading.			
874	The T reel FG cannot be detected when unthreading.			
A55	The S reel FG is detected during removal of a cassette tape.	Until the error is remedied, inhibits inserting a cassette tape.		
A75	The T reel FG is detected during removal of a cassette tape.			
A95	The S reel FG and T reel FG are detected during removal of a cassette tape.			


② Main code 06

Sub code	Detection	Operation after detection	Valid mode	Display
6A7	It is detected that the tape tension is not normal in PLAY or REC mode.	Continues operating in the mode in which the problem is detected. When enters other than PLAY or REC mode, AUTO OFF.	The error is remedied, then the unit operates normally. In PLAY or REC mode : Continues operating. In other than PLAY or REC mode : STOP, then EJECT (emergency EJECT)	Displays until the error is remedied and pressing any button.

③ Mail code 07

Sub code	Detection	Operation after detection	Valid mode	Display
042	It is detected that the speed of the capstan is not normal.	STOP	The error is remedied, then the unit operates normally.	Displays until pressing any button.
144	The capstan FG cannot be detected by FG check when inserting a cassette tape.	Removes cassette tape automatically.	—	Displays until inserting a cassette tape again.

④ Main code 08

Sub code	Detection	Operation after detection	Valid mode	Display
03A	It is detected that the speed of the drum is not normal. 	RETRY (Once unthreading, then threading again.)	EJECT	Displays until the error is remedied.
032	The drum speed problem is not remedied.	AUTO OFF	EJECT	Displays until inserting a cassette tape again.

⑤ Main code 09

Sub code	Detection	Operation after detection	Valid mode	Display
028	It is detected that the current of the threading motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
209	When detects full top or end of a tape in the threading state and then performs SHORT FF/SHORT REW, top or end is not released.	Removes cassette tape automatically.	—	
221	Threading is not completed within the specified time.	AUTO OFF	EJECT (Emergency EJECT)	
821	Unthreading is not completed within the specified time.			

• Main code 2X : Mechanical control system problem

① Main code 20

Sub code	Detection	Operation after detection	Valid mode	Display
018	It is detected that the current of the cassette up/down motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
111	The operation of cassette down is not completed within the specified time.	Removes cassette tape automatically.	—	
911	The operation of cassette up is not completed within the specified time.	AUTO OFF	Inhibits all modes.	

② Main code 21

Sub code	Detection	Operation after detection	Valid mode	Display
0C8	It is detected that the current of the reel position motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
1C1	The driving of the reel position is not completed within the specified time.	Removes cassette tape automatically.	—	

• Main code 3X : Sensors problem

The sub code of the main code 3X is 000.

Main code	Detection	Operation after detection	Valid mode	Display
30	Tape-top and tape-end are detected at the same time.	STOP	PLAY, EJECT	Displays until an error is clear up.
31	Tape-top is not released.	STOP	PLAY, FF, EJECT	
32	Tape-end is not released.	STOP	PLAY, REW, EJECT	
33	The reel position sensor detects the L position and S position at the same time.	Inhibits inserting a cassette tape.		

• Main code 9X : Communication and interface systems problem

Main code	Sub code	Detection
91	125	The interface problem between system control and keyboard is detected.
	138	Problem on the hours meter data of EEPROM is detected.
	145	The initialization problem between system control and servo is detected.
	165	The interface problem between system control and TBC is detected.
	436	Problem on the servo adjustment data of EEPROM is detected.
	455	The interface problem between main servo and sub servo is detected.
92	000	1/2 VD signal with input to system control cannot be detected.
93	000	Servo reference sync signal cannot be detected.
94	000	Servo input sync signal cannot be detected.



# 5. Probable cause of the error code

- Probable cause of the error code

Main code	02												06
Sub code	403 503 603	574 674 803	554 654	402 454 474	355 375	058 078	154 174 194 255 855 A55 A75 A95	274 874	594 694	494	395	496 596 696	6A7
Probable cause													
1. Tape clings to tape path system.	○	○	○	○				○		○			○
2. Tape winds in disorder.	○	○	○	○	○						○	○	
3. Cassette tape stainer is defective. (The cassette compartment is shaky.)	○	○	○	○				○	○	○	○	○	
4. Reel motor does not generate the specified torque.	○	○	○	○	○	○	○	○	○	○	○	○	○
5. Reel FG is defective.	○	○	○	○	○		○	○	○	○	○	○	○
6. Tension regulator is defective.	○												
7. The splice tape is used.		○	○		○				○		○	○	
8. Tape top/end sensors are defective			○	○					○	○			○
9. Insufficient pinch roller pressure									○			○	

- How to check the probable cause, board and devices

Probable cause	How to check	Board, devices
1. Tape clings to tape path system. <ul style="list-style-type: none"> <li>• Dirt on the tape</li> <li>• Dirt on the tape path system</li> <li>• HUMID</li> </ul>	<ul style="list-style-type: none"> <li>• Check that the tape clings to tape path system and drum or not.</li> <li>• Check that something attaches to the tape or not.</li> <li>• Check that any scratch is on the tape or not.</li> <li>• Check that something attaches to tape path system or not.</li> </ul>	
2. Tape winds in disorder <ul style="list-style-type: none"> <li>• Worn tape is used.</li> <li>• Scratched tape is used.</li> </ul>	<ul style="list-style-type: none"> <li>• Check that the tape winds in disorder.</li> </ul>	
3. Cassette tape stainer is defective. (The cassette compartment is shaky.)	<p>All four pins on the cassette compartment should be inserted to the holes on the slant table. The cassette compartment stainer should be installed securely.</p> <p style="text-align: center;">↓</p> <p>When the cassette compartment is shaky in inserting a cassette tape, replace the cassette compartment with a new one.</p> <p style="text-align: center;">↓</p> <p>When the cassette compartment is not shaky, the cassette compartment is defective.</p> <p>When it is shaky, drive circuit is defective.</p>	DR-214 board, MS-39 board
4. Reel motor does not generate the specified torque. <ul style="list-style-type: none"> <li>• Mechanic of reel brake is defective.</li> <li>• Reel brake solenoid is out.</li> <li>• Drive IC of reel brake solenoid is defective.</li> <li>• Reel motor is defective.</li> <li>• Drive circuit of reel motor is defective.</li> <li>• Harness is defective.</li> </ul>	<ul style="list-style-type: none"> <li>• When S/T reel brake is suspected cause: Perform the S/T reel brake check. S/T reel brake must be released.</li> <li>• When S/T reel motor is suspected cause: Perform the reel FG adjustment. The adjustment must be completed normally.</li> </ul>	<p>When S reel brake is suspected cause: DR-214 board, MS-39 board, RM-126 board, S reel brake solenoid</p> <p>When T reel brake is suspected cause: DR-214 board, MS-39 board, RM-127 board, T reel brake solenoid</p> <p>When S reel motor or S reel FG is suspected cause: SS-53 board, DR-214 board, MS-39 board, RM-126 board, SE-207 board, S reel motor, S reel FG sensor GP1A30R</p> <p>When T reel motor or T reel FG is suspected cause: SS-53 board, DR-214 board, MS-39 board, RM-127 board, SE-207 board, T reel motor, T reel FG sensor GP1A30R</p>
5. Reel FG is defective. <ul style="list-style-type: none"> <li>• Photo sensor of reel FG is defective.</li> <li>• Harness is defective.</li> </ul>	<p>Perform the reel FG adjustment.</p> <p>The adjustment must be completed normally.</p>	
6. Tension regulator is defective.	<p>Perform the hook position adjustment.</p> <p>The display must be OK.</p>	TR-84 board, MS-39 board, DR-214 board, SS-53 board, Tension sensor DM230
7. The splice tape is used.		

Probable cause	How to check	Board, devices
8. Tape top/end sensors are defective.	Perform the tape top/end check. The tape top/end sensors must be turning on or off normally.	When tape top sensor is suspected cause: PTC-67 board, MS-39 board, DR-214 board, SS-53 board, Tape top sensor  When tape end sensor is suspected cause: PD-35 board, MS-39 board, DR-214 board, SS-53 board, tape end sensor
9. Insufficient pinch roller pressure <ul style="list-style-type: none"> <li>• Mechanic of pinch roller is defective.</li> <li>• Pinch solenoid is cut.</li> <li>• Drive IC of pinch solenoid is defective.</li> </ul>	Perform the pinch roller check. The pinch roller must be pressed to capstan shaft surely.	PD-35 board, MS-39 board, DR-214 board, Pinch solenoid

### 3-5. PRINTED CIRCUIT BOARD

SYSTEM	BOARD	CIRCUIT FUNCTION	UVW-1800P	UVW-1600P
VIDEO	CP-225	Video Input/Output Connector	○	
	CP-225A	Video Output Connector		○
	VRA-5P	Input Video Selector, Y/C Separator, CTDM (Compressor), Y/C FM Modulator	○	
	RP-70P	RF REC/PB Amplifier, Full Erase Oscillator	○	
	RP-70AP	RF PB Amplifier		○
	VP-43P	Y/C PB Process (PB RF Equalizer, Demodulator, Encoder, Drop-out Detector), Video Output Driver	○	
	VP-43AP	Y/C PB Process (PB RF Equalizer, Demodulator, Encoder, Drop-out Detector), Video Output Driver		○
	TBC-25P	Time Base Corrector, CTDM (Expander)	○	○
AUDIO	CP-226	Audio Input/Output Connector	○	
	CP-226A	Audio Output Connector		○
	VR-155	REC Level Control	○	
	AR-14P	Audio REC Amplifier, LTC REC Amplifier, Audio/TC Erase Oscillator, Audio Bias	○	
	AP-31P	Audio PB Amplifier, LTC PB Amplifier, Meter Amplifier	○	
	AP-31AP	Audio PB Amplifier, LTC PB Amplifier, Meter Amplifier		○
	HP-61	Headphones Jack/Level Control, Remote Control Jack	○	
	HP-61A	Headphones Jack/Level Control, Remote Control Jack		○
	AH-43	Audio Head	○	
	AH-46	Audio Head		○
SERVO/ SYSTEM CONTROL/ TIME CODE	SS-53	System Control, Servo System Control, Time Code Generator/Reader, Character Generator	○	○
	KY-249	Function Key	○	
	KY-249A	Function Key		○
	DR-214	Motor Driver, Sensor Input Amplifier, Tension Sens. Amplifier, Drum FG/PG Amplifier, Capstan FG Amplifier, CTL REC/PB Amplifier, TAPE TOP/END DETECT	○	○
	MS-39	Cassette-in Sensor, Miss-rec Sensor, Solenoid Driver, Adjust Data Storage	○	
	MS-39A	Cassette-in Sensor, Solenoid Driver, Adjust Data Storage		○
	CL-25	Cassette Compartment (Cassette Loading Begin/Near-end Sensor, PC-62/LP-57 Connection)	○	○
	SE-207	Reel FG Sensor	○	○
	PD-35	Pinch Solenoid	○	○
	PC-62	Cassette In/Large Cassette Sensor	○	○
	TR-84	Tension Regulator Sensor	○	○
	PTC-66	Reel Position Sensor	○	○
	PTC-67	Threading Motor, Threading FG Sensor	○	○
	PTC-68	Thread End/Unthread End Sensor	○	○
	RM-126	Supply Reel Motor	○	○
	RM-127	Take-up Reel Motor	○	○
	CP-237	Remote Connector	○	
	CP-237A	Remote Connector		○
OTHERS	MB-470P	Mother Board for SS-53, TBC-25P, VP-43P and VRA-5P Boards	○	
	MB-470AP	Mother Board for SS-53, TBC-25P and VP-43AP Boards		○
	MB-471	Mother Board for RP-70P, AP-31P and AR-14P Boards	○	
	MB-471A	Mother Board for RP-70AP and AP-31AP Boards		○

Make sure to turn the power off before removing the cabinets.

Make sure to turn the power off before removing the cabinets.

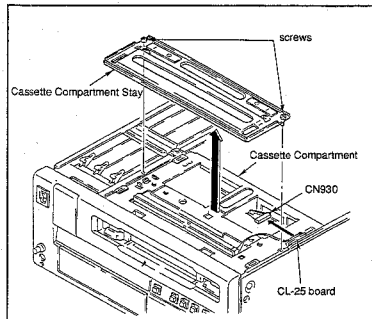


### 3-7. REMOVAL/INSTALLATION OF CASSETTE COMPARTMENT

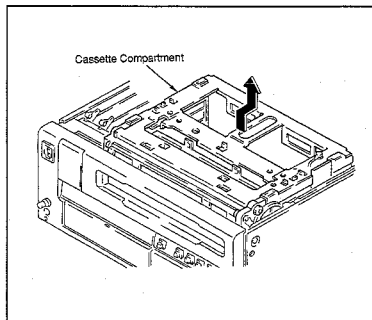
Make sure to turn the power off before removing the cabinets.

#### Removal

1. Remove the upper panel (Refer to Section 3-6.).
2. Loosen the two screws as shown in the figure, then remove the cassette compartment stay.  
These screws are retained on the stay, so they aren't out of the stay.
3. Disconnect the connector (CN930) on the CL-25 board at the upper right of the cassette compartment.



4. Lift up the cassette compartment a little. Remove it with sliding it horizontally shown in the direction of the arrow.

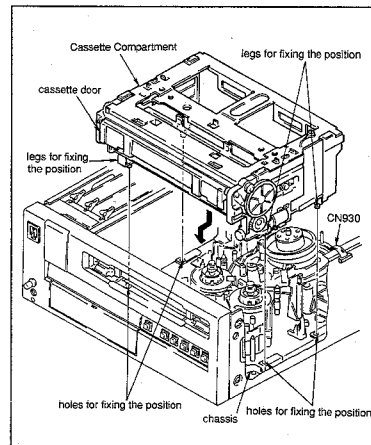


#### Installation

5. Set the harness of the connector (CN930) disconnected in step (3), so it isn't put between the chassis.
- Install the cassette compartment in the reverse order of step 4.

**Note :** At this time, confirm that the four legs of the cassette compartment for fixing the position are in the holes of the chassis for fixing the position.

6. After confirming that the cassette compartment is fixed to the chassis, install the cassette compartment stay and connect the connector (CN930) of the CL-25 board.

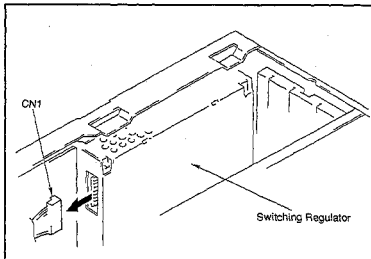


### 3-8. REMOVAL OF THE SWITCHING REGULATOR

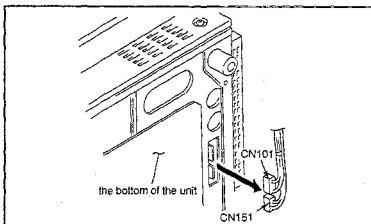
**Note :**

The switching regulator is primary side circuit. Take precaution and avoid electric shock when removing the switching regulator for replacement or another reason. There is possibility of an electric shock even when the power is turned off. Be sure to remove following more than 10 minutes after the power is turned off.

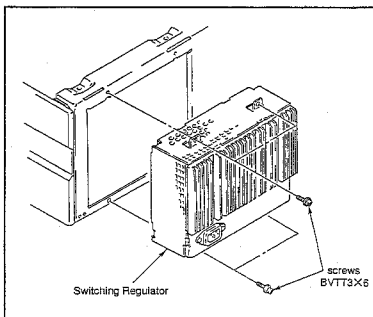
1. Remove the upper panel (Refer to Section 3-6.), then remove the VRA-5P, VP-43P and TBC-25P boards (Refer to Section 3-11-11.).
2. Disconnect the connector (CN1) of the SOPS-1046 (220V) board (Inside the switching regulator).



3. Remove the lower panel (Refer to section 3-6.) and disconnect the two connectors (CN101, CN151) of the SOPS-1046 (AC) board (Inside the switching regulator).



4. Remove four screws, then remove the switching regulator.



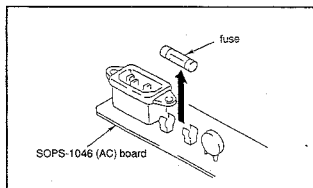
### 3-9. REPLACEMENT OF FUSE

#### Note :

A power fuse is mounted on the SOPS-1046 (AC) board of the switching regulator. When some troubles occur and an electric current flows excessively, the fuse is melted. If the fuse has blown, first remedy the cause of trouble, and then replace the fuse.

1. Remove the SOPS-1046 (AC) board (Refer to Section 3-11-11.).
2. Remove the fuse from the fuse holder, then replace it with a new one.

SONY PARTS NUMBER : 1-576-228-11 (2A, 250V)



### 3-10. EXTENSION BOARD

Two extension boards are supplied as optional accessory for check and adjustment of some printed circuit boards. Insert the extension board into the chassis of the unit and connect the circuit board to be checked or adjusted to the end of the extension board.

Extension board	Connectable Printed Circuit Boards
EX-278 J-6332-780-A	SS-53, TBC-25P, VP-43P/AP, VRA-5P
EX-279 J-6332-790-A	RP-70P/AP, AP-31P/AP, AR-14P

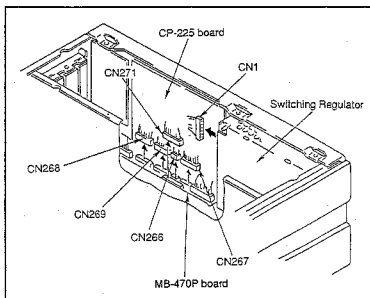


### 3-11. REPLACEMENT OF THE BOARDS

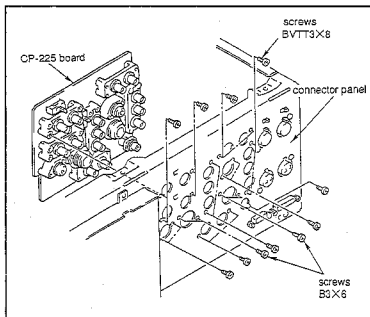
Make sure to turn the power off before removing the boards.

#### 3-11-1. CP-225 Board

1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the SS-53, TBC-25P, VP-43P and VRA-5P boards (Refer to Section 3-11-11.).
3. Disconnect the five connectors (CN266, CN267, CN268, CN269, CN271) of the MB-470 board and the connector (CN1) of the SOPS-1046 (220 V) board (Inside the switching regulator).

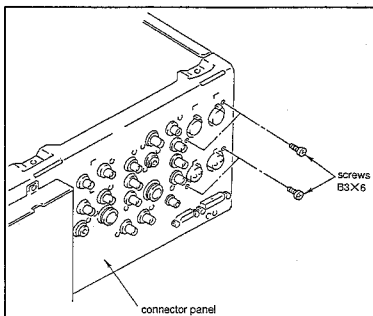


4. Remove twenty-one screws (BVTT3×8) (four out of them are B3×6), then remove the board.

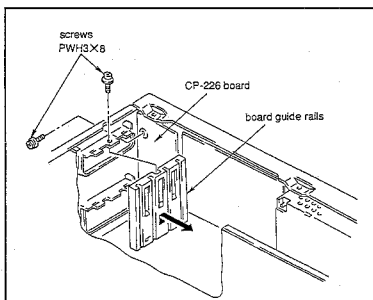


### 3-11-2. CP-226 Board

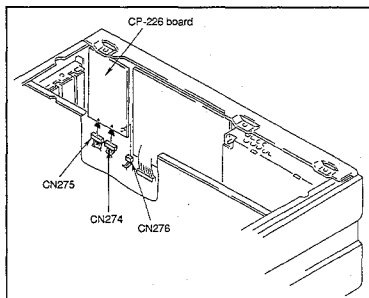
1. Remove the upper panel (Refer to Section 3-6).
2. Lift up the SS-53, TBC-25P, VP-43P and VRA-5P boards (Refer to Section 3-11-11.).
3. Remove the left side panel (Refer to Section 3-6.).
4. Remove four screws (B3×6).



5. Remove the screw (PWH3×8), then remove a board guide rails. Remove the screw (PHW3×8) from the side, then remove the board.

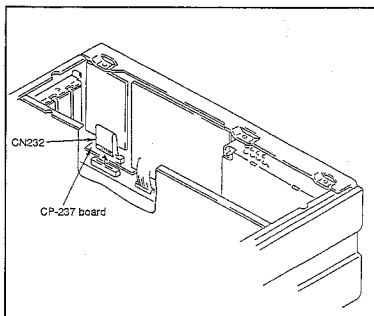


6. Disconnect the three connectors (CN275, CN274, CN276) of the CP-226 board.

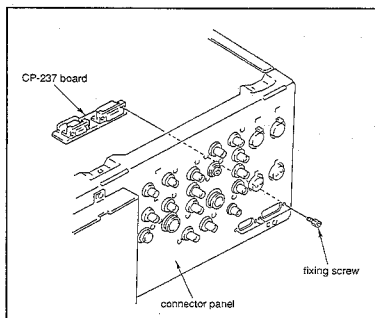


### 3-11-3. CP-237 Board

1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the VRA-5P, VP-43P and TBC-25P boards (Refer to Section 3-11-1.).
3. Disconnect the connector (CN232) of the MB-470P board.

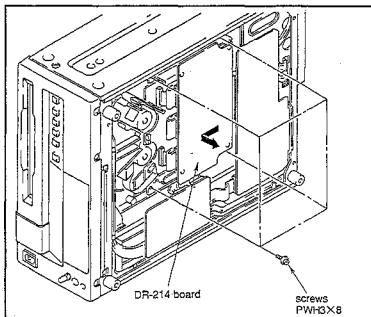


4. Remove the fixing screw, then remove the board.

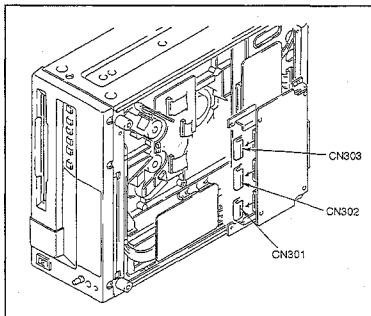


#### 3-11-4. DR-214 Board

1. Remove the lower panel (Refer to Section 3-6.).
2. Remove four screws (PWH3×8), then remove the board in the direction shown by the arrow from the connector (CN214) of the MB-470P board.

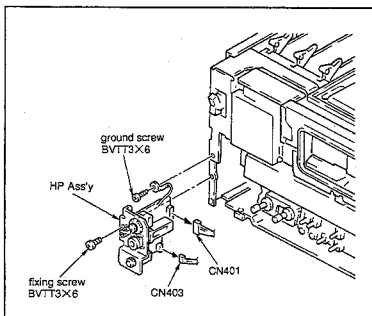


3. Pull out the three flexible card wire (CN301, CN302, CN303) from the connector.

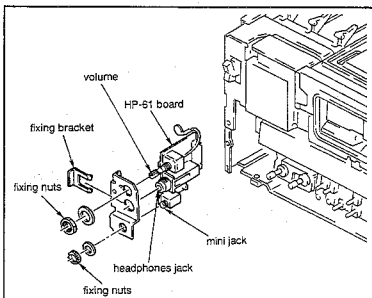


### 3-11-5. HP-61 Board

1. Remove the front panel (Refer to Section 3-6.).
2. Remove the fixing screw (BVTT3×6) and the ground screw (BVTT3×6), then remove the HP Ass'y.
3. Disconnect the two connectors (CN401, CN403) of the HP-61 board.

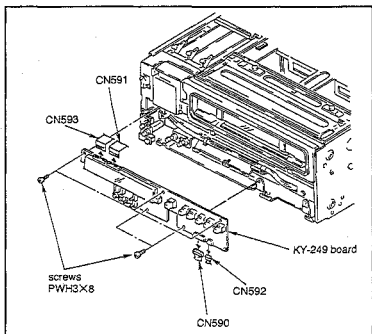


4. Remove the fixing nuts of the mini jack.
5. Remove the volume fixing nuts.
6. Remove the fixing bracket of the headphones jack, then remove the board.



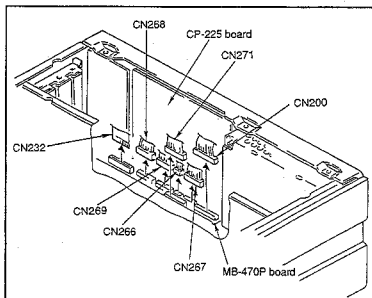
### 3-11-6. KY-249 Board

1. Remove the front panel (Refer to Section 3-6.).
2. Remove the five screws (PWH3×8) of the KY-249 board.
3. Disconnect the two connectors (CN590, CN592) of the KY-249 board.
4. Pull out the flexible card wire from the connector.

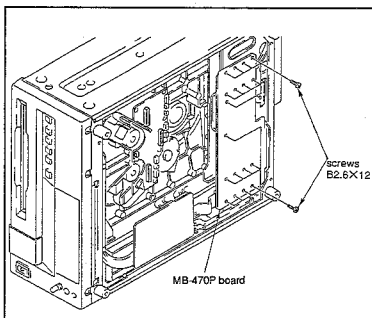


### 3-11-7. MB-470P Board

1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the SS-53, TBC-25P, VP-43P and VRA-5P boards (Refer to section 3-11-11.).
3. Disconnect the seven connectors (CN200, CN232, CN266, CN267, CN268, CN269, CN271) of the MB-470P board.

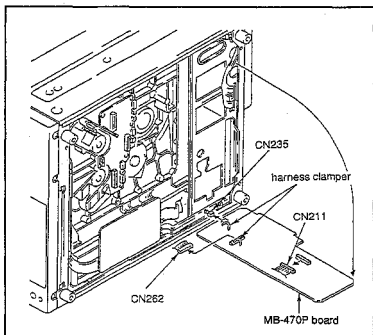


4. Remove the DR-214 board (Refer to Section 3-11-4.).
5. Remove the eighteen screws (B2.6×12) of the MB-470P board.

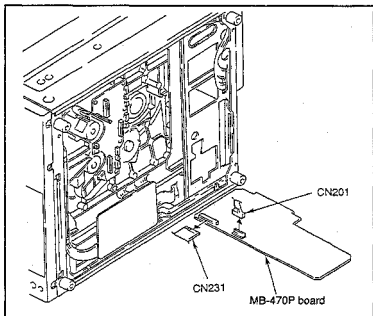




6. Open the MB-470P board and remove the two harness from the clumper, then disconnect the three connectors (CN211, CN235, CN262).

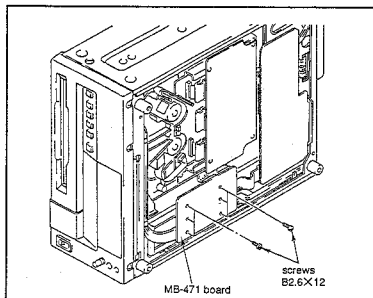


7. Disconnect the connector (CN201), and pull out the flexible card wire (CN231).

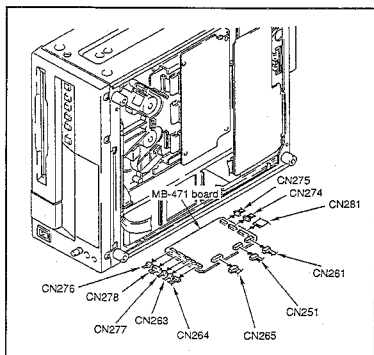


### 3-11-8. MB-471 Board

1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the AR-14P, AP-31P and RP-70P boards (Refer to Section 3-11-11.).
3. Remove six screws (B2.6×12) of the MB-471 board.

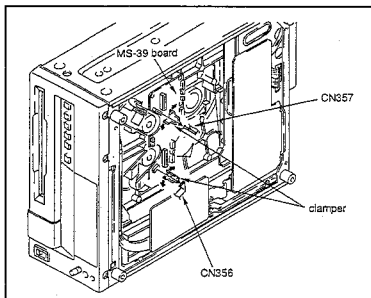


4. Pull out the flexible card wire from the connector.
5. Disconnect the ten connectors (CN251, CN261, CN263, CN264, CN265, CN274, CN275, CN276, CN277, CN278) of the MB-471 board.

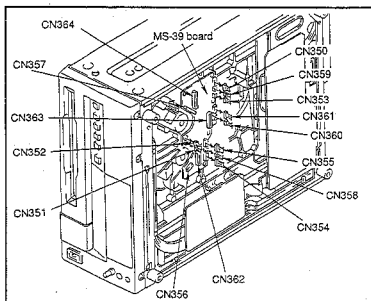


### 3-11-9. MS-39 Board

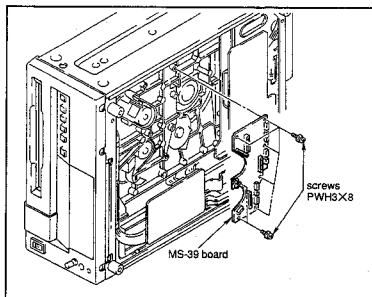
1. Remove the lower panel (Refer to Section 3-6.).
2. Remove the DR-214 board (Refer to Section 3-11-4.).
3. Remove the clumper, then pull out the flexible card wire.



4. Disconnect the thirteen connectors (CN350, CN351, CN352, CN353, CN354, CN355, CN358, CN359, CN360, CN361, CN362, CN363, CN364) of the MS-39board.

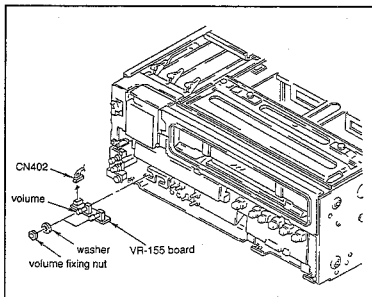


5. Remove seven screws (PWH3×8), then remove the board.



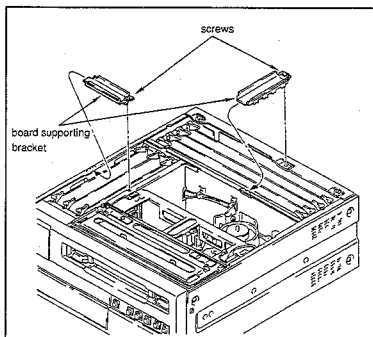
### 3-11-10. VR-155 Board

1. Remove the front panel (Refer to Section 3-6.).
2. Remove two volume fixing nuts, then remove the board.
3. Disconnect the connector (CN402) of the VR-155 board.



### 3-11-11. Removal of the card board.

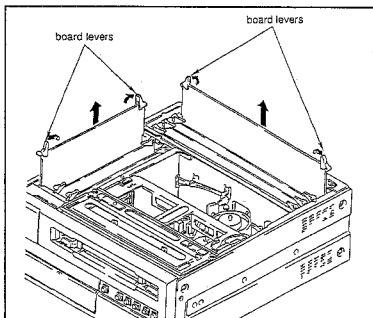
1. Remove the upper panel (Refer to Section 3-6.).
2. Loosen the screws as shown in the figure, then remove the board supporting bracket. These screws are retained on the board supporting bracket, so they aren't out of the stay.



3. Pull up the board levers in the direction shown by the arrow, then lift up the board.

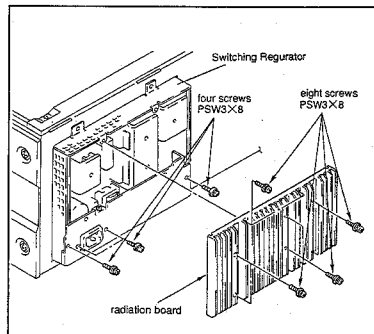
#### Note for installation

Insert the board along the board guide rails, then push it firmly until it engages with the connector on the mother board.

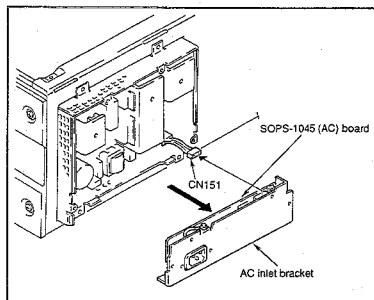


### 3-11-12. SOPS-1046 (AC) Board, SOPS-1046 (220 V) Board (Inside the switching regulator)

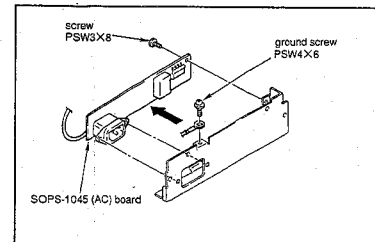
1. Remove eight screws (PSW3×8), then remove the radiation board.
2. Remove the four screws (PSW3×8) as shown in the figure.



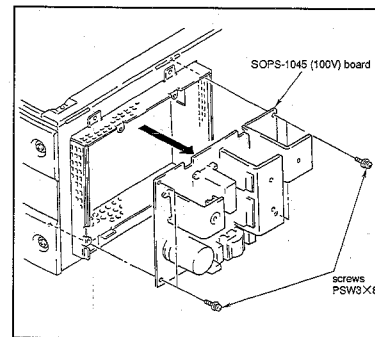
3. Pull out the AC inlet bracket and the SOPS-1046 (AC) board, then disconnect the connector (CN151).



4. Remove the screw (PSW3×8) tightened the board and the ground screw, then remove the SOPS-1046 (AC) board.



5. Remove four screws, then remove the board SOPS-1046 (220 V).



### 3-12. TAKE OUT THE CASSETTE TAPE IN SLACKING (MANUAL MODE)

Be more careful not to damage the tape when taking out the cassette tape.

#### In case ERROR is detected

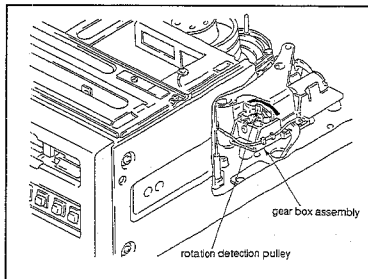
1. Press the EJECT KEY and put the unit into the EMERGENCY EJECT MODE (Refer to section 3-4-2.), then take out the cassette tape.

#### When the cassette tape cannot be taken out with the EMERGENCY EJECT MODE.

2. Referring to (Section 4 MAINTENANCE MENU), put the unit into the SERVICE SUPPORT MODE and select the MANUAL EJECT.
3. Take out the cassette tape by the display on the monitor picture.

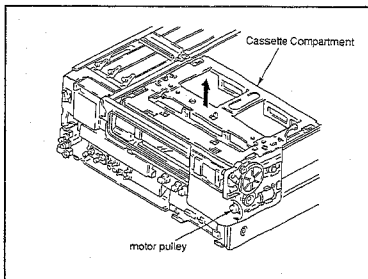
- ① In case the message below is displayed on the monitor picture, turn the rotation detection pulley of a gear box assembly in the direction shown by the arrow.

MANUAL EJECT ( 3-12 )  
THE THREADING RING  
DOES NOT FUNCTION.  
MOVE THE THREADING RING  
TO ITS UNTHREADING  
POSITION UNTIL THE NEXT  
INSTRUCTION APPEARS.  
T-REEL MOTOR WILL REWIND  
THE TAPE.  
NO CHANGE :YES KEY  
MOTOR LOCKED: NO KEY  
CANCEL:MENU KEY



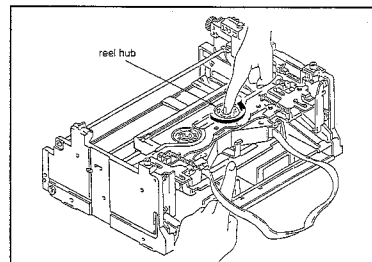
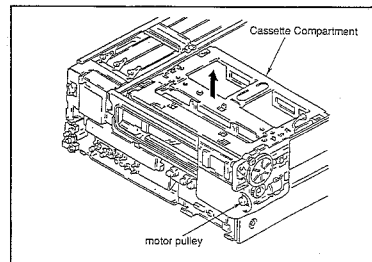
- ② In case the message below is displayed on the monitor picture, turn the motor pulley in the direction shown by the arrow, and the cassette compartment moves up, then take out the cassette tape.

MANUAL EJECT ( 3-12 )  
TURN THE POWER OFF AND  
REMOVE THE CASSETTE  
COMPARTMENT LID  
HOLDING THE LID OF  
CASSETTE OPEN.  
MENU : (+) KEY



- ③ In case of taking out the cassette tape by the removal of the cassette compartment stay.

1. Turn the power off.
2. Remove the upper panel (Refer to Section 3-6.).
3. Turn the rotation detection pulley in the direction shown by the arrow.
4. Remove the cassette compartment stay.
5. Disconnect the connector (CN930) on the CL-25 board of the cassette compartment.
6. Remove the front panel (Refer to Section 3-6.).
7. Turn the motor pulley as shown in the figure in the direction shown by the arrow.
8. While holding the cassette lid by hand to prevent it from closing so that the cassette compartment moves up (Stop rotating the pulley just before the cassette compartment begins to move to the surface.).
9. Take out the cassette compartment slowly from the unit while holding the cassette lid.
10. Wind the tape into the cassette by turning the reel hub with a finger and close the cassette lid.
11. Take out the cassette tape from the cassette compartment.
12. Turn the pulley as described in Step 7 so that the stage of the cassette compartment moves the cassette out position.
13. Install the cassette compartment to the unit.
14. Connect the connector (CN930), then install the cassette compartment stay.





### 3-13. CLEANING WHEN HEADS ARE CLOGGED

If the video head is clogged, clean the head as described in the following procedures.

#### • Cleaning with the cleaning cassette

1. Insert the cleaning cassette BCT-5CLN in the unit, and press the EJECT and PLAY buttons immediately (until one second).

Check that the EJECT button blinks and the PLAY button lights on.

**Note :** • Make sure to use the cleaning cassette BCT-5CLN. If the cleaning is performed by cleaning cassettes other than the BCT-5CLN, abnormal friction or damage of the video head may occur.

- Press the EJECT and PLAY buttons immediately after inserting the cleaning cassette BCT-5CLN in the unit.

2. After the cleaning tape is in play mode for five seconds, the tape is ejected automatically.

**Note :** Do not use the cleaning cassette with rewind.

3. Confirm that the head clog is clear.

If the video head is clogged after Step 2, clean the video head as described in the following procedure.

#### • Cleaning with the cleaning piece

1. Hold the cleaning piece moistened with cleaning fluid against the heads gently.

2. Slowly rotate the upper drum in the direction of the head's rotation with hand and clean the video head.

**Note :** • Do not move the cleaning piece in a vertical direction. This will damage the video head.

- Be sure to turn the POWER OFF, when cleaning is performed.

### 3-14. HOW TO OPERATE THE UNIT WITHOUT CASSETTE TAPE

When some mechanical alignments are performed, the unit may be operated without inserting a cassette tape.

1. Remove a cassette compartment, or disconnect connector CN930 on the cassette compartment.

2. Set S201-1 and S201-4 switches on the SS-53 board (B-1) to on. Then, turn the power ON.

**Note :** If the S201-4 switch on the SS-53 board (B-1) is not set to on, an error occurs.

The following procedures describe the operation of the unit.

#### • Threading

After the reel motor and upper drum are rotated, the threading ring begins to move, and the unit enters the threading mode.

The tension arm and threading ring move to the regular positions, and threading is completed.

This threading completed state is referred to as the STOP mode.

#### • PLAY

Press the PLAY button.

A pinch roller is pressed to the capstan shaft, and the unit enters the PLAY mode.

If the PLAY button is pressed during the threading, the pinch roller is pressed to a capstan shaft after threading is completed, and the unit enters the PLAY mode.

#### • FF

Press the F. FWD button.

A pinch roller is pressed to a capstan shaft, and the unit enters the forward search mode. The tape speed is 5 times.

#### • REW

Press the REW button.

A pinch roller is pressed to a capstan shaft, and the unit enters the rewind search mode. The tape speed is 5 times.

- REC

- A small cassette

Press the PLAY and REC buttons while pressing the MISS-REC switch for small cassette on the left side of the supply reel table.

A pinch roller is pressed to a capstan shaft, and the unit enters the REC mode.

When the MISS-REC switch is released, the unit is not in REC mode.

- A large cassette

Press the PLAY and REC buttons while pressing the MISS-REC switch for large cassette on the right side of the supply reel table.

A pinch roller is pressed to a capstan shaft, and the unit enters the REC mode.

When the MISS-REC switch is released, the unit is not in REC mode.

- Unthreading

Press the EJECT button.

A threading ring begins to move, and the unit enters the unthreading mode.

The threading ring moves to the regular positions, and unthreading is completed.

**Note :** After adjustment is completed, set the S201-1 and S201-4 switches on the SS-53 board (B-1) to off.

### 3-15. NOTE ON REPAIR PARTS

#### 3-15-1. Notes on Repair Parts

##### (1) Safety Related Components Warning

Components marked with  $\Delta$  on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

##### (2) Standardization of Parts

Repair parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".

This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts at present".

##### (3) Stock of Parts

Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

##### (4) Units for Capacitors and Resistors

The following units may be assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

Capacitors :  $\mu\text{F}$

Resistors :  $\Omega$

#### 3-15-2. Replacement Procedure for Chip Parts

##### Required Tools

Soldering iron : 20 W If possible, use a soldering iron tip heat-controller at  $270 \pm 10^\circ\text{C}$ .

Braided wire : SOLDER TAUL or equivalent  
Sony part No. 7-641-300-81

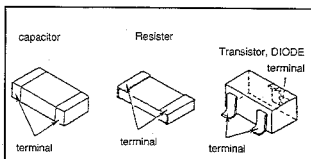
Solder : 0.6 mm dia. is recommended.

Tweezers

##### Soldering Conditions

Soldering iron temperature :  $270 \pm 10^\circ\text{C}$ .

Soldering time : less than two seconds per a pin.



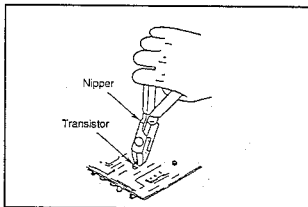
##### • Resistor and Capacitor Replacement

- (1) Place the soldering iron tip onto the chip part and heat it up until the solder is melted. When the solder is melted, slide the chip part aside.
- (2) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
- (3) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
- (4) Place new chip part in the desired position and solder both ends.

**Note :** Once a chip part has been removed, never use it again.

##### • Transistor and Diode Replacement

- (1) Cut the terminals of the chip part with a nipper.
- (2) Remove the cut leads.
- (3) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
- (4) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
- (5) Place new chip part in the desired position and solder the terminals.



##### • IC Replacement

- (1) Using the braided wire, "SOLDER TAUL" Sony Part No. 7-641-300-81, remove the solder around the pins of the IC-chip to be removed.
- (2) While heating up the pins, remove the pins one by one using sharp-pointed tweezers.
- (3) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
- (4) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
- (5) Place new chip part in the desired position and solder the pins.

### 3-15-3. Replacement of Flexible Card Wires

The following flexible card wires are used on this unit.  
When handling a flexible card wire, be very careful not to bend it because this will remarkably reduce its life.

Connection	Number of Pin	Number of Flexible Card Wire
DR-214 Board MS-39 Board	30P	3
KY-249 Board vacuum fluorescent tube display	20P	2
MS-39 Board RM-126 Board	13P	1
MS-39 Board RM-127 Board	13P	1
MB-470P Board MB-471 Board	34P	1
MB-470P Board CP-237 Board	17P	1

#### <ZIF Type>

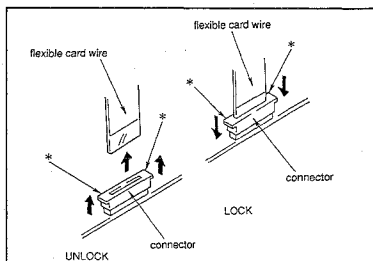
##### Disconnecting procedure

Pull up the \* marked points of connector, then pull out the flexible card wire from the connector.

##### Installing procedure

Install the flexible card wire as far as it will go (up to the line indicated on the flexible card wire), then push down the \* marked points of connector.

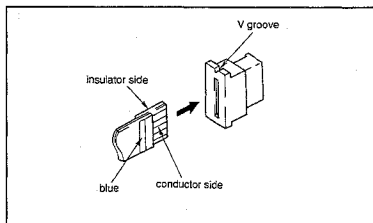
\* In case the connector doesn't have the lock structure, install and disconnect the above procedures.



#### Note :

The flexible card wire consists of the conductor side and insulator side.

Connect the flexible card wire after checking the figure. If it is not properly connected, the circuit will not work.

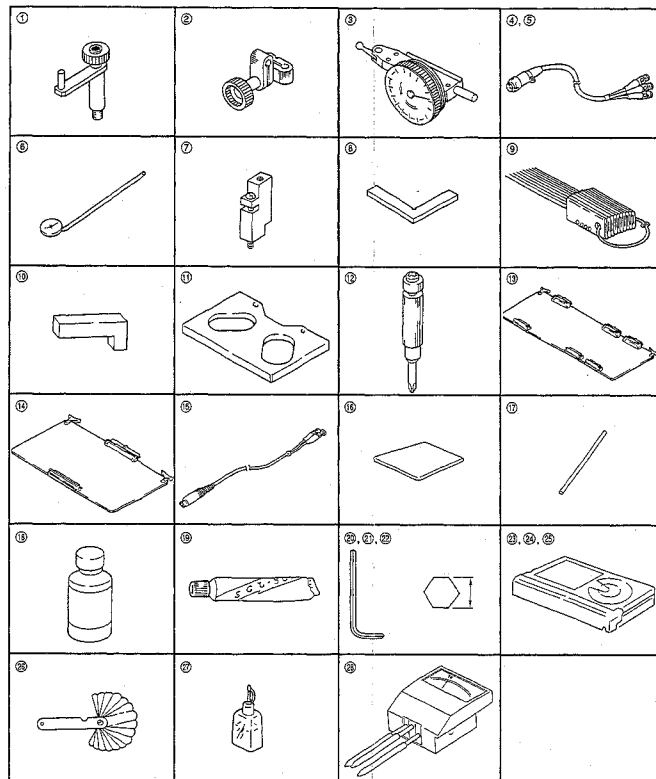


## 3-16. FIXTURES AND EQUIPMENTS

### 3-16-1. Fixtures

Fig. No	Part No.	Description	For use
1	J-6001-820-A	Drum Eccentricity Gauge (3)	Upper drum eccentricity adjustment
2	J-6001-830-A	Drum Eccentricity Gauge (2)	
3	J-6001-840-A or J-6325-530-A	Drum Eccentricity Gauge (1) or Drum Eccentricity Gauge (6)	
4	J-6031-820-A	Multi Connector Cable (DIBNC)	Video adjustment
5	J-6031-830-A	Multi Connector Cable (DOBNC)	
6	J-6080-029-A	Adjustment Mirror	Tape path adjustment
7	J-6087-000-A	Drum Eccentricity Gauge (5)	Upper drum eccentricity adjustment
8	J-6150-960-A	Reel Motor Shaft Slantness Check Fixture	Reel motor shaft slantness check and adjustment
9	J-6152-450-A	Wire Clearance Gauge	Clearance check
10	J-6320-680-A	Reel Table Height Gauge	Reel table height adjustment
11	J-6320-880-A	Cassette Base Plane (L)	Reel table height adjustment
12	J-6321-500-A	Tape Guide Adjustment Driver	Tape guide height adjustment
13	J-6332-780-A	Extension Board, EX-278	Extension board for SS-53, TBC-25P, VP-43P/AP and VRA-5P boards
14	J-6332-790-A	Extension Board, EX-279	Extension board for RP-70P/AP, AP-31P/AP and AR-14P boards
15	J-6381-380-A	S Connector Cable, EW703	
16	2-034-697-00	Cleaning Piece	Cleaning
17	3-703-360-09	Parallel Pin (3×32)	Tension regulator magnet position adjustment
18	7-661-018-18	Oil	
19	7-662-010-04	Grease, SGL-505 (20 g)	
20	7-700-736-01	L-Shaped Hexagonal Wrench (d : 1.27 mm)	
21	7-700-736-05	L-Shaped Hexagonal Wrench (d : 1.5 mm)	
22	7-700-736-06	L-Shaped Hexagonal Wrench (d : 0.89 mm)	
23	8-960-096-51	Alignment Tape, CR2-1B PS	Servo and tracking alignments (metal particle tape)
24	8-960-096-91	Alignment Tape, CR5-1B PS	Video, audio and servo alignments (metal particle tape)
25	8-960-096-86	Alignment Tape, CR8-1B PS	Audio alignments (oxide tape)
26	9-911-053-00	Thickness Gauge	Clearance check
27	9-919-573-01	Cleaning Fluid	Cleaning
28	Standard	TENTEL METER (T2-H7-SLC)	Tension adjustment

Note : TENTEL and TENTELOMETER are registered trademark of TENTEL Corp.,  
4475 Golden Foothill Pkwy El Dorado Hills, CA U.S.A.



### 3-16-2. Required Equipment

Equipment		Equivalent	Note
Oscilloscope		TEKTRONIX 2445	more than 150 MHz
Signal Generator	Component	TEKTRONIX TSG-300/TSG-131A (OP. 03)	
	Composite	TEKTRONIX TSG-131A (OP. 03)/TSG-271/1411	
	Y/C	TEKTRONIX TSG-131A (OP. 03)	S-VIDEO SG
Waveform Monitor	Component	TEKTRONIX WFM300/300A/1781/1765 (OP. SC)	
	Composite	TEKTRONIX 1751/1781/1765 (OP. SC)	with SCH meter
Picture Monitor			
Audio Signal Generator		HP 8904	
Audio Level Meter		HP 3400A	
Frequency Counter		ADVANTEST TR5821AK	
Digital Voltmeter		ADVANTEST TR6845	

## SECTION 4 MAINTENANCE MENU

This equipment provides the maintenance menu which is necessary when performing maintenance.

The maintenance menu consists of some levels. Checks, settings and adjustments are performed by moving in these levels. Contents of the maintenance menu are displayed on the video monitor which is connected with VIDEO OUTPUT 2 connector and time counter.

( ) ...time counter display/\* ...UVW-1800 only

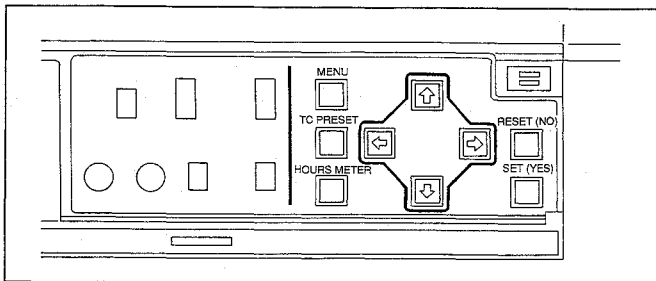
	Menu Level 1		Menu Level 2		Menu Level 3
	MENU DATA CONTROL (MENU CNT)		MENU STATUS DISPLAY (>MENU STA) SAVE MENU DATA (>Save MENU) LOAD MENU DATA (>Load MENU)		—
*	EDIT CHECK (EDIT Check)	*	VIDEO INSERT (>VIDEO INS) A1 INSERT (>A1 INS) A2 INSERT (>A2 INS) TC INSERT (>TC INS) ASSEMBLE (>ASSEMBLE)		—
	SERVO CHECK (SV Check)		SENSOR CHECK (>Sensor)	*	CASSETTE ID (>>Cass-ID) CASS-COMPARTMENT (>>Cass-COM) TAPE TOP/END (>>Top/End) HUMID [MOISTURE] (>>HUMID) REC INHIBIT (>>REC INHL.)
			MOTOR CHECK (>Motor)		S-REEL (>>S-Reel) T-REEL (>>T-Reel) THREADING (>>Threading) CASS-COMPARTMENT (>>Cass-COM) CAPSTAN (>>Capstan) DRUM (>>Drum) REEL POSITION (>>Reel POS.)
			PLUNGER CHECK (>Plunger)		PINCH (>>Pinch) S-REEL BRAKE (>>S-Brake) T-REEL BRAKE (>>T-Brake)
			AUTO CHECK (>Auto)	*	WITHOUT A TAPE (>>No tape) WITH A TAPE (>>Tape) WITH ALIGNMENT TAPE (>>Alignment) * WITH A NEW TAPE (>>New tape)
	SERVO ADJUST (SV Adjust)		S/T REEL & CAPSTAN (>Reel&Cap) S-REEL ONLY (>S-Reel) T-REEL ONLY (>T-Reel) CAPSTAN ONLY (>Capstan)		—
			TENSION (>Tension)		MAGNET & HOOK POS. (>>Magnet) HOOK POS. (>>HOOK) TENSION (>>Tension)
			RF SWITCHING POSITION (>Switching)		AUTO (>>Auto) MANUAL (>>Manual)

	Menu Level 1		Menu Level 2		Menu Level 3
	SERVO ADJUST (SV Adjust)		PICTURE SPLITTING (>Splitting)		—
			SAVE/LOAD CONTROL (>Save/Load)		SAVE ADJUSTING DATA (>>Save) LOAD ADJUSTING DATA (>>Load) INITIALIZE (>>Initial)
	SERVICE SUPPORT (Support)		ERROR LOG (>Error LOG) ERROR DIAGNOSTICS (>Erro DIAG) DEVICE DIAGNOSTICS (>Dev. DIAG) MANUAL EJECT (>Manu. Eject)		—
	OTHERS (Others)		SOFTWARE VERSION (>Version) KEYBOARD CHECK (>KY check) CF DATA CHECK (>CF check)		—
			MEMORY DISPLAY (>MEM. check)		SY MEMORY DISPLAY (>>SY MEM.) SV MEMORY DISPLAY (>>SV MEM.)



## 4-1. OPERATION

Following switches are used so as to execute the maintenance menu.



The MENU/↑/↓/←/→/SET (YES)/RESET (NO) switches on the sub control panel are used.

The maintenance menu consists of some levels. Select an item by moving in these levels.

↑/↓ key ..... Moving in the same level.

←/→ key ..... Moving to the upper or lower level. (Ignored if a lower level does not exist.)

\* Display ..... Monitor : Displayed item is shifted down one column.

Time counter : ">" is displayed on top.

} Indicates the level of the menu.

### [How to enter the maintenance menu]

1. While pressing the (←) key, press the MENU key.  
Then the unit enters into the maintenance menu, and the menu picture is displayed on the monitor.
2. Press the (↑), (↓) keys to select the item to change.  
Move the high lighted item to select the item on a monitor display.
3. Press the (→) key at the item to select.  
This selects the high lighted item.

### [How to close the maintenance menu]

Press the MENU key.

## 4-2. MENU DATA CONTROL

This item allows SETUP MENU data display and SETUP MENU data save/load.

This allows restoring the original setup after maintenance is complete or after ROM version is updated.

### [Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "MENU DATA CONTROL" on the monitor display using the (↑), (↓) keys.



MENU CNT

3. Press the (→) key.  
Then "MENU DATA CONTROL" is selected, and the menu of the lower level is displayed.



>MENU STA

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the SET (YES) key at the selected item to display the content of the selected item.
6. Press the (←) key to exit, returning to the menu picture.
7. When closing the maintenance menu, press the MENU key.

### MENU STATUS DISPLAY

The contents of the current SETUP MENU data are displayed.

MENU VERSION : Setup menu version of this unit.  
NUMBER OF ITEM : Number of setup menu item.  
CHANGED ITEM : The number of items which are  
changed from the factory default  
settings.  
DATA CHECK SUM : Data check sum.

### SAVE MENU DATA

The user-set setup menu data can be temporarily saved to be used for re-setup at a latter time.

1. The current setup menu version is displayed, waiting for the SET (YES) key input.

\* Press the RESET or LEFT keys to return to the menu picture.

Press the MENU key to exit the maintenance menu.

2. Press the SET (YES) key.

Memorize the setup menu data to EEPROM.

Confirm that save is performed, and "COMPLETE" is displayed.

**Note :** • The saved setup menu data will not be lost by turning ON/OFF the power, replacing boards or updating the ROM version. But because the saved data is stored in the MS microprocessor, the saved data will be lost when the MS board or the MS microprocessor is replaced.

- When the setup menu version is revised by updating the ROM version, the following alarm message is displayed. In that case, initialize the SETUP MENU or execute the "LOAD MENU DATA".

#### MENU STATUS

MENU VERSION : V0.6  
NUMBER OF ITEM : 056  
CHANGED ITEM : 001  
DATA CHECK SUM : 11DC

>>Menu V0.6

#### SAVE MENU DATA

CURRENT MENU VERSION  
V0.6

SAVE OK ?

>>Save OK ?

#### SAVE MENU DATA

COMPLETE !!

COMPLETE

## LOAD MENU DATA

When loading is executed, the saved data is saved as an ordinary setup menu data.

1. The current setup menu and the setup menu version to load are displayed, waiting for the SET (YES) key input.

\* Press the RESET or LEFT keys to return to the menu picture. Press the MENU key to exit the maintenance menu.

```
LOAD MENU DATA

SAVED      CURRENT
MENU       MENU
VERSION    VERSION

V0.6  --->  V0.6

LOAD OK ?
```

>>Load OK ?

2. Press the SET (YES) key.

Memorize the setup menu data to EEPROM.

Confirm that load is performed, and "COMPLETE" is displayed.

```
LOAD MENU DATA

COMPLETE !!

UNCHANGED DATA : 056
CHANGED DATA   : 0
IRREGUL DATA   : 0
DELETED ITEM     : 0
ADDED ITEM       : 0
```

Complete!!

### In case of NG

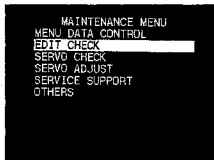
If the setup menu data has not been saved yet, or the saved menu has trouble, the load operation will not start.

### 4-3. EDIT CHECK

This item allows check of edit function without using a remote controller, and so on.

[Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "EDIT CHECK" on the monitor display using the (↑), (↓) keys.



EDIT Check

3. Press the (←) key. Then "EDIT CHECK" is selected, and the menu of the lower level is displayed.



>VIDEO INS

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the SET (YES) key at the selected item to display the content of the selected item.
6. Press the (←) key to exit, returning to the menu picture.
7. When closing the maintenance menu, press the MENU key.

#### **VIDEO INSERT**

When the REC and PLAY keys are pressed at the same time, the VIDEO INSERT mode is entered.

#### **A1 INSERT**

When the REC and PLAY keys are pressed at the same time, the AUDIO CH-1 INSERT mode is entered.

#### **A2 INSERT**

When the REC and PLAY keys are pressed at the same time, the AUDIO CH-2 INSERT mode is entered.

#### **TC INSERT**

When the REC and PLAY keys are pressed at the same time, the CODE INSERT mode is entered.

#### **ASSEMBLE**

When the REC and PLAY keys are pressed at the same time, the ASSEMBLE mode is entered.

#### 4-4. SERVO CHECK

Servo system is checked automatically or semiautomatically in this item.

##### [Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVO CHECK" on the monitor display using the (↑), (↓) keys.

```
MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS
```

>SV Check

3. Press the (→) key. Then "SERVO CHECK" is selected, and the menu of the lower level is displayed.
4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.  
Then the menus of the lower level are displayed.

```
MAINTENANCE MENU
SERVO CHECK
SENSOR CHECK
MOTOR CHECK
PLUNGER CHECK
AUTO CHECK
```

>Sensor

6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.  
(Refer to each page of menu item about a method of check.)
8. When check is finished, press the MENU key to return to the menu picture.  
Or, press the (←) key to return to the MENU key.
9. If there are other menus or sub menus wishing to be checked, repeat steps 4 to 8.
10. When closing the maintenance menu, press the MENU key.

**Note :** When the MENU key is pressed in executing the check, the check is ended by force. Then, the monitor returns to the menu picture.

```
MAINTENANCE MENU
SERVO CHECK
SENSOR CHECK
CASSETTE ID
CASS-COMPARTMENT
TAPE TOP/END
HUMID(MOISTURE)
REC INHIBIT
```

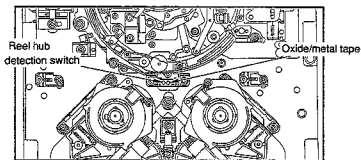
>>Cass-ID

## SENSOR CHECK

The items of the "SENSOR CHECK" are explained here.

### (1) CASSETTE ID

This mode checks the cassette detection switch.



1. Press the reel hub detection switch with finger and so forth.

Confirm that \* is displayed on the "1" which is in the monitor.

2. Press the oxide/metal tape detection switch with finger and so forth.

Confirm that \* is displayed on the "2" which is in the monitor.

In case of NG

If \* isn't display on the appointed number, check the sensor on the MS-39 board.

```
MAINTENANCE MENU
SERVO CHECK
SENSOR CHECK
CASSETTE ID
CASS-COMPARTMENT
TAPE TOP/END
HUMID(MOISTURE)
REC INHIBIT
```

```
>>Cass-ID
```

```
SERVO CHECK MODE
CASSETTE SW
SW1: LARGE/SMALL HUB
SW2: METAL/OXIDE TAPE
1 2
S-REEL T-REEL
CANCEL : MENU KEY
```

```
CHECKING
```

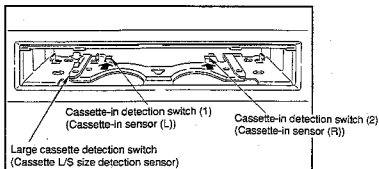
```
SERVO CHECK MODE
CASSETTE SW
SW1: LARGE/SMALL HUB
SW2: METAL/OXIDE TAPE
* 2
S-REEL T-REEL
CANCEL : MENU KEY
```

```
SERVO CHECK MODE
CASSETTE SW
SW1: LARGE/SMALL HUB
SW2: METAL/OXIDE TAPE
1 *
S-REEL T-REEL
CANCEL : MENU KEY
```



## (2) CASS-COMPARTMENT

This item checks the Cassette Compartment switch.



1. Press the cassette-in detection switch (1) (cassette-in sensor (L)) by hand and so on.

Confirm that \* is displayed on the "1" which is in the monitor.

2. Press the cassette-in detection switch (2) (cassette-in sensor (R)) by hand and so on.

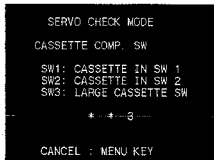
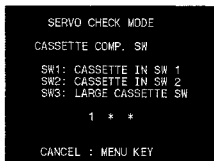
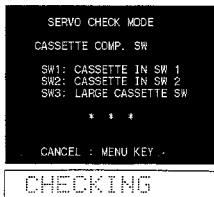
Confirm that \* is displayed on the "2" which is in the monitor.

3. Press the cassette-in detection switch (3) (cassette L/S size detection sensor) by hand and so on.

Confirm that \* is displayed on the "3" which is in the monitor.

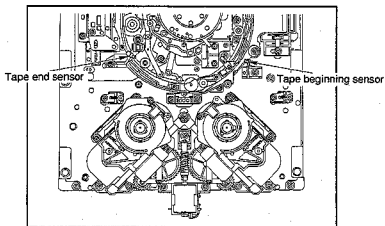
### In case of NG

If \* isn't displayed on the appointed number, check the sensor on the PTC-62 board and the sensor input circuit (MS-39 board).

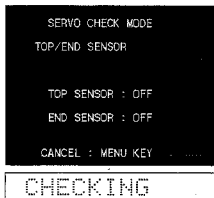


### (3) TAPE TOP/END

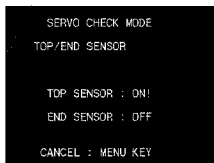
This item checks the tape beginning/end sensor.



1. Draw a screwdriver up to the tape beginning sensor.  
Confirm that "TOP SENSOR: OFF" which is in the monitor changes into "TOP SENSOR: ON!"



2. Draw a screwdriver up to the tape end sensor.  
Confirm that "END SENSOR: OFF" which is in the monitor changes into "END SENSOR: ON!"

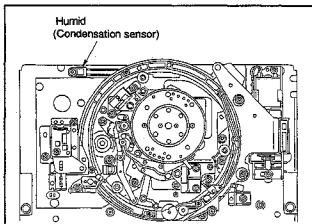


#### In case of NG

If "OFF" does not change into "ON!", check that the tape beginning/end sensor is normal or not, individually. And check the tape beginning/end sensor circuit (DR-214 board).

#### (4) HUMID (MOISTURE)

This item checks the humid (condensation) sensor.



1. Touch the humid (moisture) sensor softly with a wet applicator.

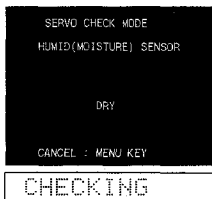
Confirm that "DRY" which is in the monitor picture changes into "WET!".

2. Mop the moisture of the humid (moisture) sensor with a dry applicator, or blow the sensor with a blower to evaporate.

Confirm that "WET!" which is in the monitor picture changes into "DRY!"

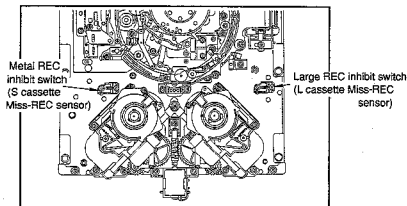
#### In case of NG

If "DRY" does not change to "WET!" when the humid sensor is damped, check that condensation sensor is normal or not, individually. And check the humid sensor amplifier (SS-53 board).



## (5) REC INHIBIT

This item checks the REC inhibit switch.



1. Press the metal REC inhibit switch (S cassette MISS-REC sensor).

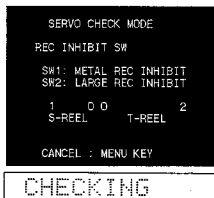
Confirm that \* is displayed on the "1" which is in the monitor.

2. Press the large REC inhibit switch (L cassette MISS-REC sensor).

Confirm that \* is displayed on the "2" which is in the monitor.

### In case of NG

If \* is not displayed on the appointed number, check the sensor on the MS-39 board.



## MOTOR CHECK

The items of the "Motor check" are explained here.

### (1) S-REEL

This mode checks the S-reel motor.

After selecting the SET (YES) key, press the (↑), (↓) keys. (note: Keep pressing for 1 to 2 seconds.) This rotates the motor in FWD or REV direction. Check that the brake solenoid is activated to release the reel brake. The S-reel motor rotates in the specified direction as long as the (↑), (↓) key is pressed.

#### In case of NG

If the brake solenoid does not make the actuating sound, and the S-reel motor does not rotate in the selected direction, check the S-reel motor and the reel motor driver circuit (DR-214 board and SS-53 board).

### (2) T-REEL

This mode checks the T-reel motor.

After selecting the SET (YES) key, press the (↑), (↓) keys. (note: Keep pressing for 1 to 2 seconds.) This rotates the motor in FWD or REV direction. Check that the brake solenoid is activated to release the reel brake. The T-reel motor rotates in the specified direction as long as the (↑), (↓) key is pressed.

#### In case of NG

If the brake solenoid does not make the actuating sound, and the T-reel motor does not rotate in the selected direction, check the T-reel motor and the reel motor driver circuit (DR-214 board and SS-53 board).

```
MAINTENANCE MENU
SERVO CHECK
MOTOR CHECK
< S-REEL >
T-REEL
THREADING
CASS-COMPARTMENT
CAPSTAN
DRUM
REEL POSITION
```

```
>> S-Reel
```

```
SERVO CHECK MODE
```

```
S REEL MOTOR
```

```
WIND OUT DIR. : (↑) KEY
WIND IN DIR.  : (↓) KEY
```

```
CANCEL : MENU KEY
```

```
CHECKING
```

```
SERVO CHECK MODE
```

```
T REEL MOTOR
```

```
WIND IN DIR.  : (↑) KEY
WIND OUT DIR. : (↓) KEY
```

```
CANCEL : MENU KEY
```

```
CHECKING
```

### (3) THREADING

This item checks the threading motor and threading-end/unthreading sensor.

1. After selecting the SET (YES) key, keep pressing the (↑) key to rotate the motor in the FWD direction. Confirm that threading takes place and "THREAD END" is displayed on monitor.

```
SERVO CHECK MODE
THREADING MOTOR

*** UNTHREAD END ***

THREADING : (↑) KEY
UNTHREADING : (↓) KEY

CANCEL : MENU KEY
```

CHECKING

```
SERVO CHECK MODE
THREADING MOTOR

*** THREAD END ***

THREADING : (↑) KEY
UNTHREADING : (↓) KEY

CANCEL : MENU KEY
```

CHECKING

2. Keep pressing the (↓) key to rotate the motor in REV direction. Confirm that the threading ring is unthreaded and "UNTHREAD END" is displayed.

```
SERVO CHECK MODE
THREADING MOTOR

*** UNTHREAD END ***

THREADING : (↑) KEY
UNTHREADING : (↓) KEY

CANCEL : MENU KEY
```

CHECKING

#### In case of NG

If the threading motor does not rotate, "....." is displayed on the monitor after finishing threading, or "UNTHREAD END" is not displayed on the monitor after finishing unthreading, confirm that whether the threading motor (DR-214 board), driver circuit (SS-53 board) and sensor on the PTC-68 board are normal or not. Also, check the loading FG amplifier circuit (DR-214 board), and sensor (PTC-67 board).

```
SERVO CHECK MODE
THREADING MOTOR

.....

THREADING : (↑) KEY
UNTHREADING : (↓) KEY

CANCEL : MENU KEY
```

CHECKING

#### (4) CASS-COMPARTMENT

This item checks the cassette compartment motor.

Press the SET (YES) key.

Press the (→) key.

Compartment goes down.

Confirm that cassette compartment goes up when pressing the (→) key.

(Compared with going case, the display on the monitor changes in the reverse order.)

#### In case of NG

If the display on the monitor doesn't change, check the cassette compartment motor and the sensor input circuit (MS-39 board).

SERVO CHECK MODE  
CASSETTE COMP. MOTOR  
  
UP

CHECK : (→) KEY  
CANCEL : MENU KEY

CHECKING

SERVO CHECK MODE  
CASSETTE COMP. MOTOR  
  
HORIZON

CHECK : (→) KEY  
CANCEL : MENU KEY

CHECKING

SERVO CHECK MODE  
CASSETTE COMP. MOTOR  
  
VERTICAL

CHECK : (→) KEY  
CANCEL : MENU KEY

CHECKING

SERVO CHECK MODE  
CASSETTE COMP. MOTOR  
  
DOWN

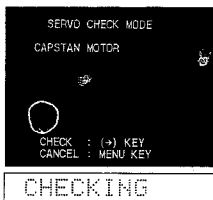
CHECK : (→) KEY  
CANCEL : MENU KEY

CHECKING

#### (5) CAPSTAN

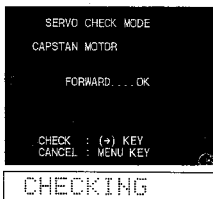
This item checks the capstan motor.

Press the SET (YES) key.



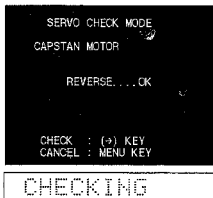
1. Press the (→) key.

Confirm that "FORWARD...OK" is displayed on the monitor.



2. Press the (→) key again.

Confirm that "REVERSE...OK" is displayed on the monitor.



#### In case of NG

If the display on the monitor doesn't change, check the capstan motor and the capstan motor driver circuit (DR-214 board and SS-53 board).



#### (6) DRUM

This item checks of the drum motor.

```
SERVO CHECK MODE
DRUM MOTOR

SPEED :   NG
PHASE  :   UNLOCK
PG     :   NO EXIST

CANCEL : MENU KEY
```

CHECKING

After selecting the SET (YES) key,

**SPEED** : Confirm that the display on the monitor changes into "OK".

**PHASE** : Confirm that the display on the monitor changes into "LOCK".

**PG** : Confirm that the display on the monitor changes into "EXIST".

```
SERVO CHECK MODE
DRUM MOTOR

SPEED :   OK
PHASE  :   LOCK
PG     :   EXIST

CANCEL : MENU KEY
```

CHECKING

#### In case of NG

If the display on the monitor doesn't change, check the drum motor, drum motor driver circuit, drum FG amplifier circuit, and drum PG amplifier circuit (DR-214 board and SS-53 board).

## (7) REEL POSITION

This mode checks the reel position motor and the reel L/S position sensor.

SERVO CHECK MODE  
REEL POSITION MOTOR  
  
S-POSITION

CHECK : (+) KEY  
CANCEL : MENU KEY

CHECKING

After selecting the SET (YES) key, and press the (→) key. Confirm that the reel tables moves S-position to L-position, and the display changes.

SERVO CHECK MODE  
REEL POSITION MOTOR  
  
L-POSITION

CHECK : (+) KEY  
CANCEL : MENU KEY

CHECKING

### In case of NG

If the reel table does not move and the display on the monitor does not change, check the reel shift motor, reel L/S position sensor (MS-39 board) and reel position motor driver circuit (DR-214 board).

## PLUNGER CHECK

The items of the "PLUNGER CHECK" are explained here.

### (1) PINCH

This mode checks the pinch roller solenoid.

When selecting the SET (YES) key, threading takes place and the pinch solenoid is activated.

When selecting the MENU key, the pinch solenoid is released and unthreading takes place.

And the monitor returns to the menu screen.

```
MAINTENANCE MENU
SERVO CHECK
PLUNGER CHECK
<- PINCH ->
S-REEL BRAKE
T-REEL BRAKE
```

>> Pinch

SERVO CHECK MODE

PINCH ROLLER

PINCH ON

PINCH OFF : (4) KEY  
CANCEL : MENU KEY

CHECKING

SERVO CHECK MODE

PINCH ROLLER

PINCH OFF

PINCH ON : (1) KEY  
CANCEL : MENU KEY

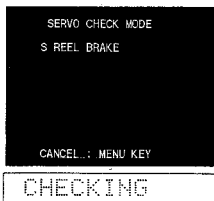
## (2) S-REEL BRAKE

This item checks of the S reel brake solenoid.

1. Press the SET (YES) key.  
S-reel brake solenoid is activated.
2. Press the MENU key.  
Then S-reel brake solenoid is released.  
And the monitor returns to the menu screen.

### In case of NG

If the S brake solenoid does not make the actuating sound, and monitor does not change, check the S-reel brake solenoid and its driver circuit (DR-214 board and MS-39 board).



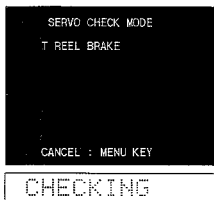
## (3) T-REEL BRAKE

This mode checks of the T reel brake solenoid.

1. Press the SET (YES) key.  
T-reel brake solenoid is activated.
2. Press the MENU key.  
Then T-reel brake solenoid is released.  
And the monitor returns to the menu screen.

### In case of NG

If the T brake solenoid does not make the actuating sound, and monitor does not change, check the T-reel brake solenoid and its driver circuit (DR-214 board and MS-39 board).



## AUTO CHECK

- (1) WITHOUT A TAPE
- (2) WITH A TAPE
- (3) WITH A ALIGNMENT TAPE
- (4) WITH A NEW TAPE

\* This menu is Factory  
usc.

#### 4-5. SERVO ADJUST

Servo system is adjusted automatically or semiautomatically in this menu.

##### [Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVO ADJUST" on the monitor display using the (↑), (↓) keys.

```
MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS
```

SV Adjust

3. Press the (→) key.  
Then "SERVO ADJUST" is selected, and the menu of the lower level is displayed.

```
MAINTENANCE MENU
SERVO ADJUST
← S/T-REEL & CAPSTAN →
S-REEL ONLY
T-REEL ONLY
CAPSTAN ONLY
TENSION
RF SWITCHING POSITION
PICTURE SPLITTING
SAVE/LOAD CONTROL
```

>Reel & Cap

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.  
Then the menus of the lower level are displayed.

```
MAINTENANCE MENU
SERVO ADJUST
TENSION
MAGNET & HOOK POS.
HOOK POS.
TENSION
```

>>Magnet

6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.  
(Refer to each page of item about a method of adjustment.)
8. When adjustment is finished, press the MENU key to return to the menu picture.  
Or, press the (←) key to return to the MENU key.
9. If there are other items wishing to be checked, repeat steps 4 to 8.
10. When all the checks are performed, the adjustment data is saved in EEPROM by executing the "SAVE/LOAD CONTROL".

**Note :** When one item of adjustment is completed, the adjustment data can be saved in EEPROM by executing the "SAVE/LOAD CONTROL". When items of more than two adjustments are completed, the adjustment data can be saved in EEPROM by executing the "SAVE/LOAD CONTROL".

Never turn off the power in the adjustment. If the power is turned off in the adjustment, the adjustment data will be erased.

11. When closing the maintenance menu, press the MENU key.

**Note :** When the MENU key is pressed in executing the check, the check is ended by force. Then, the monitor returns to the menu picture.

### S/T REEL & CAPSTAN

Adjustment related to S-reel, T-reel and capstan are performed automatically.

Confirm that adjustment is performed, and "COMPLETE" is displayed.

#### Items of adjustment

- s reel fg check
- s reel offset/friction
- s reel torque
- t reel fg check
- t reel offset/friction
- t reel torque
- capstan fg duty
- capstan free speed

#### In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit, the capstan motor driver circuit and the capstan FG amplifier circuit (DR-214 board, SS-53 board).

SERVO ADJUST MODE  
CAPSTAN FREE SPEED

COMPLETE

ADJUST MENU : (+) KEY

COMPLETE

#### **S-REEL ONLY**

Adjustment related to S-reel are performed automatically.  
Confirm that adjustment is performed, and "COMPLETE" is displayed.

#### **Items of adjustment**

- s reel fg check
- s reel offset/friction
- s reel torque



#### **In case of NG**

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit (DR-214 board, SS-53 board).



#### **T-REEL ONLY**

Adjustment related to T-reel are performed automatically.  
Confirm that adjustment is performed, and "COMPLETE" is displayed.

#### **Items of adjustment**

t reel fg check  
t reel offset/friction  
t reel torque

#### **In case of NG**

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit (DR-214 board, SS-53 board).

SERVO ADJUST MODE  
T REEL TORQUE

COMPLETE

ADJUST MENU : (+) KEY

COMPLETE

#### CAPSTAN ONLY

Adjustment related to capstan are performed automatically.  
Confirm that adjustment is performed, and "COMPLETE" is displayed.

#### Items of adjustment

- capstan fg duty
- capstan free speed

#### In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the capstan motor driver circuit (DR-214 board and SS-53 board) and the capstan FG amplifier circuit (SS-53 board).



## TENSION

The item "TENSION" are explained here.

### (1) MAGNET & HOOK POS

Tension regulator magnet adjustment and hook position adjustment.

\* Refer to section 6-37.

### (2) HOOK POS

Tension regulator hook position adjustment only.

\* Refer to section 6-38.

### (3) TENSION

Tension adjustment using Tentelometer.

\* Refer to section 6-36.

```
MAINTENANCE MENU
SERVO ADJUST
TENSION
MAGNET & HOOK POS.
HOOK POS.
TENSION
```

>Magnet

```
SERVO ADJUST MODE
PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-37).
```

SET THE PIN ( 3mm ).

NEXT : (+) KEY  
CANCEL : MENU KEY

ADJUSTING

```
SERVO ADJUST MODE
PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-38).
```

NEXT : (+) KEY  
CANCEL : MENU KEY

ADJUSTING

```
SERVO ADJUST MODE
PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-36).
```

SET CASSETTE  
AND PUSH STOP KEY.

CANCEL : MENU KEY

ADJUSTING

## RF SWITCHING POSITION

The sub menus of the "RE SWITCHING POSITION" are explained here.

### (1) AUTO

This mode adjusts the RF switching position automatically.  
Insert an alignment tape CR2-1B, and press the play button.

**Note :** Be sure to use the alignment tape CR2-1B.  
Do not use other alignment tape.

Confirm that adjustment is performed, and "COMPLETE" is displayed.  
The cassette tape eject automatically.

#### In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check that the playback alignment tape was CR2-1B or not. And check the DO pulse circuit.

### (2) MANUAL

This mode adjusts the RF switching position manually.  
\* Refer to section 7-13.

MAINTENANCE MENU  
SERVO ADJUST  
RF SWITCHING POSITION  
← AUTO →  
MANUAL

Auto

SERVO ADJUST MODE  
RF SWITCHING POSITION  
AUTO ADJUST

SET ALIGNMENT TAPE CR2-1B  
AND PUSH PLAY KEY.

CANCEL : MENU KEY

ADJUSTING

SERVO ADJUST MODE  
RF SWITCHING POSITION  
AUTO ADJUST  
COMPLETE

ADJUST MENU : (+) KEY

COMPLETE

## PICTURE SPLITTING

This mode adjusts the picture splitting.

**Note :** This mode is performed only when the picture splitting large specially.  
(If more than 1.5  $\mu$ sec., or more than 1/5 of a color bar width)

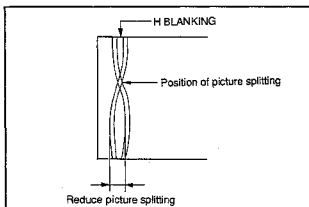
1. Connect the video monitor to TP201 on the VP-43 board using the clip cable.

\* Set the monitor as following.

- H DELAY
- AFC FAST
- INT SYNC

**Note :** It is impossible to observe picture splitting with the video monitor which captured the H sync strongly by the AFC circuit in the monitor.

2. Make adjustment according to the instruction shown on screen.



SERVO ADJUST MODE

PICTURE SPLITTING

PERFORM ADJUSTMENTS  
REFERRING TO SERVICE  
MANUAL (4-5).  
SET  
ALIGNMENT TAPE CRS-1B  
AND PUSH PLAY KEY.

CANCEL : MENU KEY

ADJUSTING

SERVO ADJUST MODE

PICTURE SPLITTING

MEMORIZE POSITION OF  
PICTURE SPLITTING.

NEXT : (+) KEY  
CANCEL : MENU KEY

ADJUSTING

SERVO ADJUST MODE

PICTURE SPLITTING

SHIFT THE LARGE SPLITTING  
TO THE SAME POSITION  
OF MEMORIZED POSITION  
WITH (+) OR (-) KEY.

NEXT : (+) KEY  
CANCEL : MENU KEY

ADJUSTING

SERVO ADJUST MODE

PICTURE SPLITTING

REDUCE PICTURE  
SPLITTING  
WITH (+) OR (-) KEY.

NEXT : (+) KEY  
CANCEL : MENU KEY

ADJUSTING

3. Confirm that adjustment is performed and "COMPLETE" is displayed.



## SAVE/LOAD CONTROL

The sub menus of the "SAVE/LOAD CONTROL" are explained here.

```
MAINTENANCE MENU
SERVO ADJUST
SAVE/LOAD CONTROL
< SAVE ADJUSTING DATA >
LOAD ADJUSTING DATA
INITIALIZE
```

```
>>Save
```

### (1) SAVE ADJUSTING DATA

Save the adjustment data in EEPROM.

Confirm that Save is performed, and "COMPLETE" is displayed.

**Note :** After adjustment is completed, make sure to save in this mode.

```
SERVO ADJUST MODE
NOW SAVING ...

COMPLETE

ADJUST MENU : (+) KEY
```

### (2) LOAD ADJUSTING DATA

Load the adjustment data in EEPROM.

Confirm that Load is performed, and "COMPLETE" is displayed.

```
SERVO ADJUST MODE
NOW LOADING ...

COMPLETE

ADJUST MENU : (+) KEY
```

### (3) INITIALIZE

Perform this item only when either MS-39 board or microcomputer on the MS-39 board is exchanged.

Load the Initial data of adjustment data from ROM.

Load the initial data of the adjustment data from ROM.

Confirm that Initialize is performed, and "COMPLETE" is displayed.

```
SERVO ADJUST MODE
INITIALIZE

COMPLETE

ADJUST MENU : (+) KEY
```

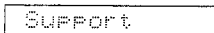
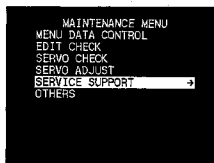
```
COMPLETE
```

## 4-6. SERVICE SUPPORT

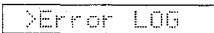
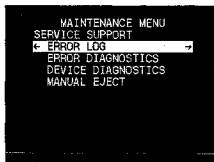
This item has the function to display and diagnose the errors and the error codes that have occurred in the past and also the function to diagnose the devices.

### [Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVICE SUPPORT" on the monitor display using the (↑), (↓) keys.



3. Press the (→) key.  
Then "SERVICE SUPPORT" is selected, and the menu of the lower level is displayed.



4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.  
Then the menus of the lower level are displayed.
6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.  
(Refer to each page of item about a method of check.)
8. When check is finished, press the MENU key to return to the menu picture.
9. If there are other items wishing to be checked, repeat steps 4 to 8.
10. When closing the maintenance menu, press the MENU key.



## ERROR LOG

This displays the errors that have occurred in the past in this model.

(Maximum eight errors are displayed from the most recent one.)

MAINTENANCE MENU  
SERVICE SUPPORT  
ERROR LOG  
ERROR-02-855

Select the SET (YES) key, and contents of the trouble are displayed on the monitor.

DRUM ERROR  
ABNORMAL  
DRUM SPEED.

CANCEL : MENU KEY

\* The error occurred most recently is displayed on the top.

**Note :** The errors of servo system are memorized. ERROR-91, 92, 93 and 94 are not memorized.

## ERROR DIAGNOSTICS

In this item, error number is displayed.

```
MAINTENANCE MENU
SERVICE SUPPORT
ERROR DIAGNOSTICS
ERROR-02
← ERROR-02-058 →
ERROR-02-078
ERROR-02-154
ERROR-02-174
ERROR-02-194
ERROR-02-255
ERROR-02-274
ERROR-02-355
```

Select the SET (YES) key, and contents of the trouble are displayed on the monitor.

```
S-REEL ERROR
EXCESSIVE S-REEL MOTOR
CURRENT DETECTED.
```

CANCEL : MENU KEY

#### DEVICE DIAGNOSTICS

\* This menu is Factory use.

DIAGNOSTICS is not supported.

#### MANUAL EJECT

The operating method to take out the tape when the normal EJECT is impossible is displayed.

Select the SET (YES) key, and the "MANUAL EJECT" is entered.

Take out the tape according to the instruction on screen.

SERVICE SUPPORT

START OK ?

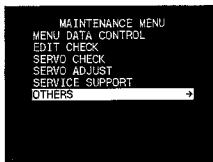
NO KEY : RETURN TO MENU  
YES KEY : ADJUST START

#### 4-7. OTHERS

In this item, it is able to check the SOFT version, CF data and display contents of memory, etc.

##### [Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVO ADJUST" on the monitor display using the (↑), (↓) keys.



Others

3. Press the (→) key.  
Then "SERVO ADJUST" is selected, and the menu of the lower level is displayed.



>Version

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.  
Then the menus of the lower levels are displayed.
6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.  
(Refer to each page of item about a method of check.)
8. When check is finished, press the MENU key to return to the menu picture.
9. If there are other menus or sub menus wishing to be checked, repeat steps 4 to 8.
10. When closing the maintenance menu, press the MENU key.

## SOFTWARE VERSION

Press the (←) key or RESET key to return to the maintenance menu.

PAL : PAL, For EK  
(EDITOR : Recorder and player of EDIT/1800P  
FEEDER : Player of EDIT/1600P  
SYSCON : Version of IC4 on the SS-53 board  
SERVO : Version of IC212 on the SS-53 board  
MENU : Version of initial setup menu



\* The content of display on the time counter can be changed by pressing the (↑) and (↓) keys.

Returns to the maintenance menu using the (←) key or RESET key.

## KEYBOARD CHECK

In this mode, it is able to check the key on the keyboard, slide switch and time counter.

1. Press the SET (YES) key, to enter into the KEYBOARD CHECK.

**Note :** Once a machine enters the KEYBOARD CHECK mode, it cannot exit without turning off the power.

2. The monitor displays settings of all switches on the sub control panel. All dots of the time counter light.

### KEYBOARD CHECK

VIDEO INPUT : Y-R, B  
DISPLAY SEL : CTL  
RMT/LOCAL : LOCAL  
CHARACTER : ON  
TC INPUT : INT  
AUDIO CH-1/2: 00,00

KEY INPUT :

>KY Check

### KEYBOARD CHECK

VIDEO INPUT : Y-P, B  
DISPLAY SEL : CTL  
RMT/LOCAL : LOCAL  
CHARACTER : ON  
TC INPUT : INT  
AUDIO CH-1/2: 00,00

KEY INPUT : REC

REC

3. If any key is pressed or switch setting is changed, the condition that all displays are lighting is canceled.

Information about the changed switch or the pressed key is displayed.

If two or more switches are pressed at the same time, "DOUBLE KEYIN" is displayed.

\* Turn OFF the power to stop this mode.

### KEYBOARD CHECK

VIDEO INPUT : COMPOSITE  
DISPLAY SEL : LTC  
RMT/LOCAL : REMOTE  
CHARACTER : ON  
TC INPUT : INT  
AUDIO CH-1/2: 00,00

KEY INPUT : DOUBLE KEYIN

Double!!

[The symptoms which seem to be defective.]

- ① Display function of the time counter is defective.
  - There is a segment which does not light even in the mode of all lamps lighting.
  - There is an abnormally bright or dark segment.
  - When any key is not pressed, no display is expected, but a segment is lighting.
- ② Key enter is defective.
  - Any key is not pressed, but a key name or "DOUBLE" is displayed.  
(When key setting is changed, the switch name is kept displayed. This is not trouble.)
  - A key is pressed, but the key name is not displayed.
- ③ Key illumination is defective.
  - A key is pressed, but the key is not illuminated.
  - Any key is not pressed, but a key is illuminated.
- ④ Switch input is defective.
  - A switch setting is changed, but the setting name is not displayed.

## CF DATA CHECK

In this mode video signal and CF data is displayed.

Select the appropriate time counter item with the (↑), (↓) keys.

CF data: 0, 1, 2, 3 (field)

\* Due to the display timings, only the even fields are displayed.

- **DIFF OF REF** : Display of field number only is not enough for identification of relative phase relationship. The difference from the REF. VIDEO ID is displayed in ( ).

**REF VIDEO ID** : The CF field Number of REF video signal.

**INPUT VIDEO ID** : The CF field number of the input VIDEO signal.

The signals other than the composite signal has no CF information.

"0" is displayed.

When the input video signal is the composite signal, the STANDARD/ NONSTANDARD information of the input signal is also displayed.

(only on the monitor)

**PB VIDEO ID** : The signals other than the composite signal has no CF information.

In VIDEO EE mode, the CF field number of the input video signal is displayed.

**REC VIDEO ID** : The CF field number of the video signal to be recorded on tape during record mode.

**TCR VIDEO ID** : "0" is displayed. Playback TC signal.

**TCG ID** : The CF field number of the TC data generated by TC generator.





**MEMORY DISPLAY**

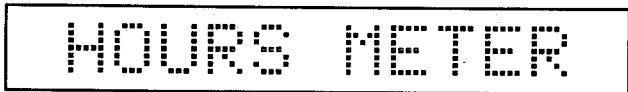
\* This menu is Factory use.

## SECTION 5 PERIODIC MAINTENANCE AND INSPECTION

### 5-1. HOURS METER

The data values of the hours meter are displayed on the monitor and time counter display. Therefore, the hours meter values are not displayed unless power of the unit is turned on. It is recommended to use this hours meter as the reference of the periodic maintenance.

#### HOURS METER



There are 4 display modes in this hours meter, and each mode displays the total hours or total number of the movements. T2, T3 and CT have two types of meter: one meter can be reset and the other can not be reset.

Note : The actual hours or number of the movements are ten times of the displayed number.

Mode	Contents Displayed
T1 : OPERATION	Total hours while the power is turned on.
T2 : DRUM ROTATION	Total hours while the drum is rotating in the thread-end mode.
T3 : TAPE RUNNING	Total hours while the tape is running in each mode of fast forward, rewind, playback, search, recording and editing. (Except for the still picture mode during searching.)
CT : THREADING	Total number of times of threading and unthreading.

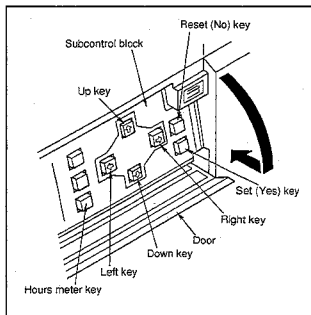
Example : The following indicates that the total hours of drum rotation is 1500 hours in the threading end status.



X10

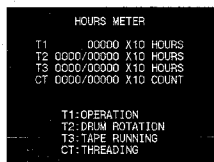
### 5-1-1. Hours Meter Display

1. Open the door of the subcontrol block as illustrated in the figure.



2. Press the hours meter key.
3. The monitor screen displays the hours meter values of T1, T2, T3 and CT.
4. The time counter only displays one of T1, T2, T3 or CT. However, it is possible to display the other item's value by pressing the up or down key.
5. In the mode selection of T2, T3 or CT, the hours meter value which can be reset is displayed at first.
6. The hours meter value which cannot be reset is displayed on the right while the right key is held down.

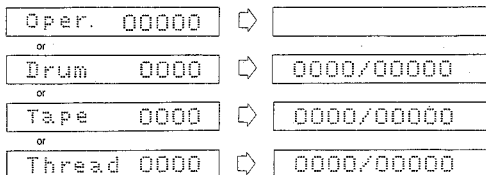
[Monitor Screen]



Note : If the hours meter value exceeds the limit of the display, "-----" will be displayed.

7. Press the hours meter key to return to the initial mode.

[Counter Display]



### 5-1-2. Hours Meter RESET

1. Turn on the switch S201-1 on the SS-53 board.  
(Refer to section 6-1.)
2. Press the hours meter key while holding down the left key.
3. Select the item to be reset with the up or down key.
4. Press the reset key. "0000" appears on the display and flashes.
5. Press the set key. The monitor screen confirms whether it is permitted to reset or not.
6. If it is permitted to reset, press the serkey again to terminate the hours meter display mode.

**Precaution :** While data is being saved, the following message is displayed.

If the power is turned off while this message is displayed, the unit may not be reset. Do not turn off the power until the message disappears.

```
HOURS METER  
  
T2. --, --  
  
RESET OK ?  
  
NO KEY : CANCEL  
YES KEY : RESET  
H.M.KEY : ABORT & EXIT
```

```
Reset OK ?
```

7. Turn off the switch S201-1 on the SS-53 board.  
(Refer to section 6-1.)

```
HOURS METER  
  
NOW SAVING ...
```

```
Saving...
```

## 5-2. MAINTENANCE AFTER SERVICING UNIT

After servicing the unit, perform the following maintenance regardless of the hours that the unit is used.

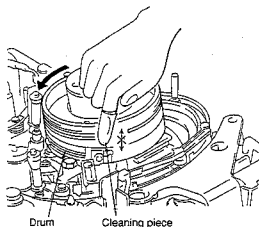
1. Cleaning of the video head or stationary heads.  
(For how to clean, refer to sections 5-2-1 and 5-2-2.)
2. Cleaning of the tape contacting surface.  
(For how to clean, refer to section 5-2-3.)

**Precaution :** Insert the cassette tape after the cleaning fluid is completely dried.

### 5-2-1. Video Head Cleaning

Put the cleaning piece moistened with the cleaning fluid to the head lightly, and slowly rotate the drum manually to clean the head.

Do not move the cleaning piece vertically.



**Precaution :** Do not move the cleaning piece vertically to the drum rotating direction (vertical direction to the drum) during cleaning.  
Turn off the power during cleaning.

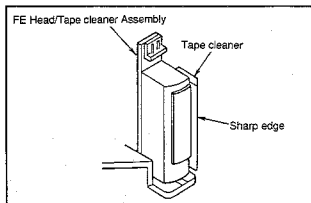
### 5-2-2. STATIONARY Head Cleaning

Clean the Audio/TC Head, CTL Head and FE Head/Tape cleaner Assembly with the cleaning piece moistened with the cleaning fluid.

### 5-2-3. Tape Contacting Surface Cleaning

Clean the parts which contact the tape, such as Tape Guides, Upper/Lower Drums, Capstan, Pinch Roller, Tape Cleaner, with the cleaning piece moistened with the cleaning fluid.

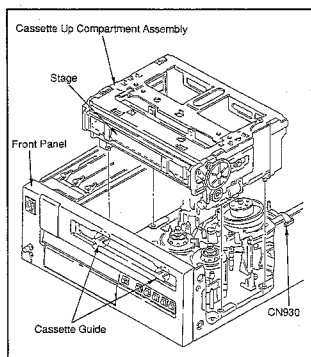
**Precaution :** When cleaning the tape cleaner, be careful of the sharp edge of the tape cleaner.



### 5-2-4. Cassette Up Compartment Entrance Cleaning

Clean the cassette guides and their surroundings and the entire stage of the Cassette Up Compartment with the cleaning piece moistened with the cleaning fluid.

**Precaution :** Before cleaning, remove the Cassette Up Compartment so as not to drop some parts into the unit.



### 5-3. PERIODIC INSPECTION TABLE

The hours shown in the table are not the period of guarantee. Refer to this table in order to operate the functions and optimum performance of the unit and extend the life of the unit and tapes when planning the maintenance schedule.

The time of the parts replacement depends on the environment and condition that the unit is used.

☆ : Replace the parts ◇ : Check (Adjustment)

	Maintenance Parts			Hours Meter	Maintenance Time (H)								Remarks			
	Maintenance Item	Parts No.	Q' TY	Display Mode	750	1500	2250	3000	3750	4500	5250	6000	Exploded View Page	Replacement Procedure	Application/Remarks	
Drum Block	Upper Drum Assembly	A-8260-975-	1	T2	☆	☆	☆	Note 2	☆	☆	☆	Note 2	18-10	Refer to section 6-2.	For UVW-1800P.	
	Upper Drum Assembly	A-8260-979-	1	T2	☆	☆	☆	Note 2	☆	☆	☆	Note 2	18-10	Refer to section 6-2.	For UVW-1600P.	
	Drum Assembly	A-8260-974-	1	T2	—	—	—	☆	—	—	—	☆	18-10	Refer to section 6-3.	For UVW-1800P.	
	Drum Assembly	A-8260-978-	1	T2	—	—	—	☆	—	—	—	☆	18-10	Refer to section 6-3.	For UVW-1600P.	
Drive Block	Pinch Solenoid	1-454-338-11	1	T2	—	—	—	—	—	—	—	☆	18-14	Refer to section 6-17		
	Lining Assembly (S and T)	X-3167-231-	2	T2	—	—	—	◇	—	—	—	◇	18-4, 8	Refer to section 6-13	No problem when there is a clearance.	
	Reel Motor (S and T)	1-698-231-11	2	T2	—	—	—	—	—	—	—	◇	18-4, 8	Refer to section 6-9.		
	Gear Box Block Limiter Rubber	3-180-653-	1	CT	Replace at 100,000 times									18-6	—	
Tape Path Block	CTL Head	8-825-554-83	1	T2	—	—	—	☆	—	—	—	☆	18-14	Refer to section 6-22.		
	Audio/Time Code Head	8-825-778-91	1	T2	—	—	—	◇	—	—	—	◇	18-14	Refer to section 6-24.	For UVW-1600P.	
	Audio/Time Code Head	8-825-778-81	1	T2	—	—	—	◇	—	—	—	◇	18-14	Refer to section 6-24.	For UVW-1800P.	
	Capstan Motor	1-698-179-11	1	T2	—	—	—	☆	—	—	—	☆	18-10	Refer to section 6-21.		
	Pinch Roller Arm Assembly	X-3717-215-	1	T2	☆	☆	☆	☆	☆	☆	☆	☆	18-6	Refer to section 6-15.		
	Tape Threading Guide Assembly	X-3167-224-	1	T2				◇				◇	18-6	Refer to section 6-30.		
	Tape Threading Guide Upper Flange	3-182-340-	1	T2				☆				☆	18-6	Refer to section 6-31.		
	Tension Regulator Roller Assembly	X-3675-851-	1	T2	—	—	—	◇	—			◇	18-10	Refer to section 6-35.		
	Tension Regulator Roller Upper Flange	3-677-752-	1	T2	—	—	—	☆				☆	18-10	Refer to section 6-34.		
	Guide Roller Assembly	X-3167-225-	3	T2	—	—	—	◇				◇	18-6	Refer to section 6-32.		
Cleaner	Cleaning Roller	X-3167-232-	1	T2	☆	☆	☆	☆	☆	☆	☆	☆	18-6	Refer to section 6-26.		
	AT Cleaner	3-182-389-	1	CT	Replace at 100,000 times									18-6	Refer to section 6-25.	
Others	Cassette Up Compartment Limiter Rubber	3-181-431-	1	CT	Replace at 200,000 times									18-16	—	

T1 : OPERATION

T2 : DRUM ROTATION

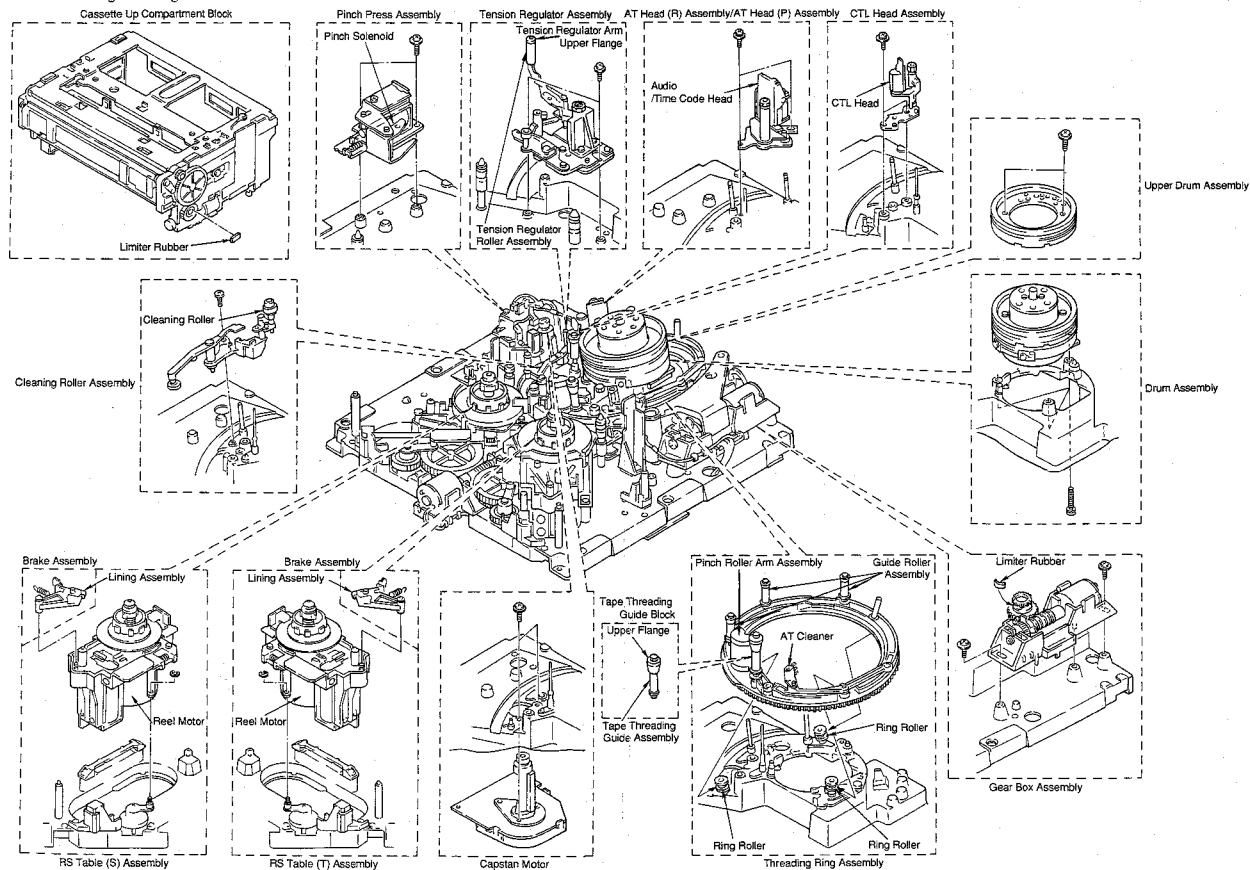
T3 : TAPE RUNNING

CT : THREADING

**Note 1 :** The life of the heads may be shortened when the unit is used in the place where there is high temperature, humidity or dusty. Therefore, use the unit in an air conditioned room and not in dusty areas. It is recommended to stock the tape at normal temperature and humidity.

**Note 2 :** When the Drum Assembly is replaced, the Upper Drum Assembly is also replaced.

# 5-3-1. Maintenance Item Configuration Figure



## SECTION 6 REPLACEMENT OF MECHANICAL PARTS

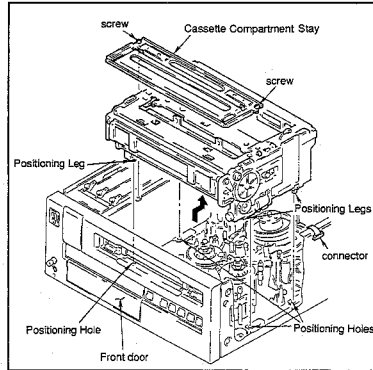
### 6-1. GENERAL INFORMATION FOR PARTS REPLACEMENT/ADJUSTMENT

#### 6-1-1. Preparation Before Parts Replacement

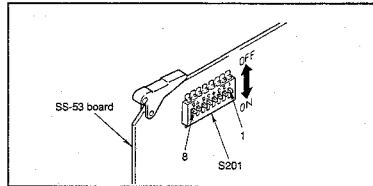
1. Use of cassette compartment  
When replacing mechanical parts and adjusting the mechanism, remove the cassette compartment from the unit unless otherwise specified.

##### Cassette compartment removal

- 1) Remove the top panel.
- 2) Unplug the connectors connected to the cassette compartment.
- 3) Loosen the two screw fixing the cassette compartment stay. The stays have the drop-safe metals of the screws so the screws cannot be removed from the cassette compartment stays.
- 4) Remove the cassette compartment from the unit.



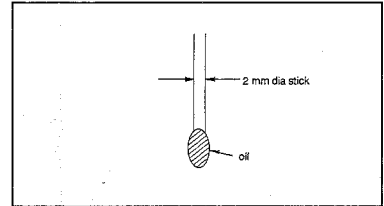
2. How to operate the VTR without cassette compartment.  
When the connectors are unplugged from the cassette compartment, the protection circuit works. To operate the VTR without cassette compartment, perform the followings.
- 1) Set the switch S201-4 on the SS-53 board to on. This disables the function of the protection circuit. The VTR can be operated without cassette compartment or without a cassette tape inserted in the unit.
- 2) Set the switch S201-1 on the SS-53 board to on to enter the adjustment mode. Switching of L and S positions of RS table becomes possible.



The procedure for this selection is as follows. Open the front door and press the Right key once to move the RS table to either S cassette or L cassette position. When pressed again, it returns to the original position.

**Precaution :** After the adjustment is completed, be sure to set the switches S201-1 and -4 on the SS-53 board to off positions.

3. Oil  
Sony parts no. 7-661-018-18  
Use the specified oil for parts replacement and others. Different type of oil has the different viscosity and ingredients. It can cause severe troubles in the unit.  
Do not use oil containing dust, etc., that may injure spindles and bearings. It can cause severe troubles. A drop of oil is defined as follows.  
The amount of oil on the tip of a stick having 2 mm diameter.



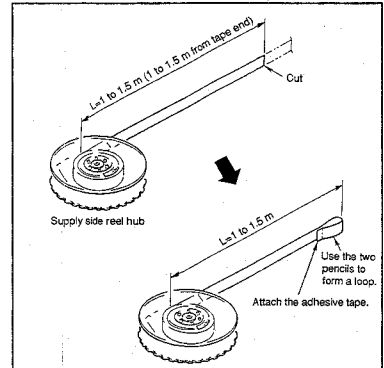
4. Grease  
Sony parts no. 7-662-010-04  
(grease type SGL-505)  
Use the specified grease applied to the movable parts. Different type of grease has the different viscosity and ingredients. It can cause severe troubles in the unit.  
Do not use grease containing dust, etc., that may injure spindles and bearings. It can cause severe troubles.

##### Amount of Grease to Apply

Apply grease so that a thin film is form on the surface.

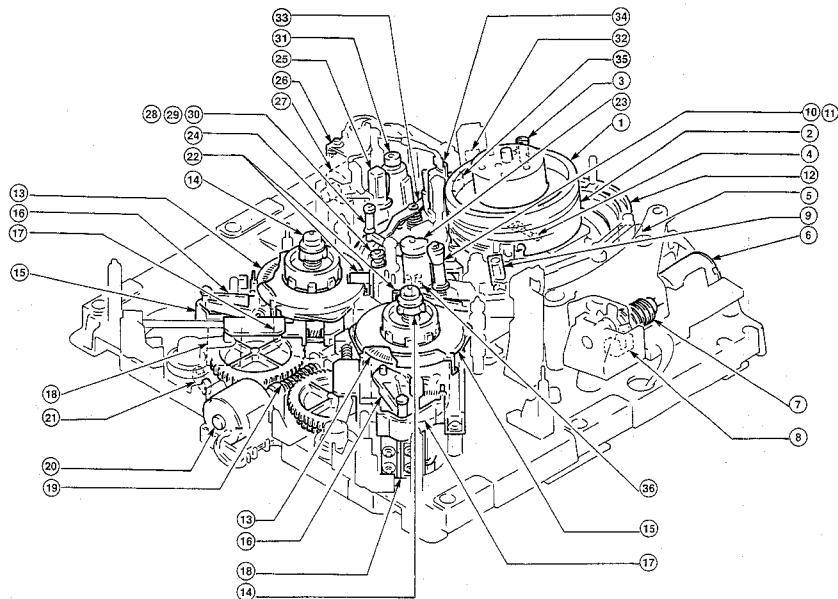
Wipe the extra grease bulged outside the coating surface with soft cloth.

5. Fabricating the Tension Adjustment Tape.  
Disassembly the S cassette tape (20 minute or 30 minute use). Obtain the supply side reel hub. Fabricate the tension adjustment tape as shown in the figure. This tape is used for tension measurement.





## 6-1-2. REPLACEMENT PARTS INDEX



No.	Parts Name	Section No.	Page	Exploded View Page
1	Upper Drum	6-2	6-3	18-10
2	Drum Assembly	6-3	6-8	18-10
3	Guide Roller Assembly (three points)	6-32	6-64	18-6
4	Guide Shaft Grounding Assembly	6-4	6-12	18-10
5	Ring Position Detecting Element (PTC-68 M't)	6-28	6-60	18-10
6	Gear Box Motor	6-18	6-44	18-6
7	Worm Gear (gear box)	6-19	6-47	18-6
8	Gear Box Motor Rotation Detecting Element (PTC- 67 M't)	6-20	6-49	18-6
9	AT Cleaner	6-25	6-57	18-6
10	Tape Threading Guide	6-30	6-62	18-6
11	Tape Threading Guide Upper Flange	6-31	6-63	18-6
12	Threading Ring Assembly	6-33	6-65	18-6
13	Reel Disc (S, T)	6-7	6-18	18-4, 8
14	Reel Table Assembly	6-5	6-13	18-4, 8
15	RS Table (S, T) Assembly	6-8	6-20	18-4, 8
16	Brake Lining Assembly (S, T)	6-13	6-34	18-4, 8
17	Reel Motor (S, T)	6-9	6-25	18-4, 8
18	Brake Solenoid (S, T)	6-14	6-38	18-4, 8
19	Worm Gear (LS motor)	6-11	6-32	18-8
20	Reel Position Motor	6-10	6-30	18-8
21	Reel Position Detecting Element (PTC-66 M't)	6-12	6-33	18-12
22	Reel Rotation Detecting Element (SE-207 M't)	6-6	6-17	18-4, 8
23	Pinch Roller Assembly	6-15	6-39	18-6
24	Ring Roller (three points)	6-29	6-61	18-6
25	FE Head Block/Tape Cleaner Assembly	6-23	6-54	18-14
26	Pinch Press Assembly	6-16	6-41	18-14
27	Pinch Solenoid	6-17	6-42	18-14
28	Tension Regulator Assembly	6-36	6-70	18-10
29	Tension Regulator Roller Assembly	6-35	6-69	18-10
30	Tension Regulator Arm Upper Flange	6-34	6-68	18-10
31	Capstan Motor	6-21	6-50	18-10
32	Audio/TC Head	6-24	6-55	18-14
33	Roller for Cleaning Roller	6-27	6-59	18-6
34	CTL Head	6-22	6-52	18-14
35	Cleaning Roller	6-26	6-58	18-6
36	Tension Regulator Return Arm Assembly	6-38	6-82	18-10

## 6-2. UPPER DRUM REPLACEMENT

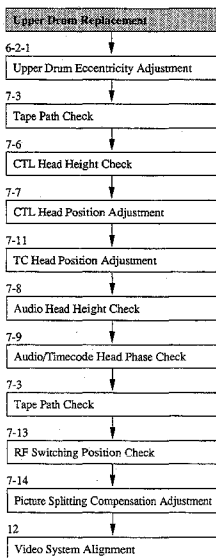
- The Upper Drum is the periodic replacement parts. Replace it referring to the periodic replacement list.
- When the video head has worn out or is damaged, replace the Upper Drum Assembly.
- When the upper drum is removed and a shim is found on the flange, be sure to leave it on the flange. If the shim should be lost or replaced with a thicker one, video head height from the reference plane will be incorrect, resulting in loss of interchangeability.

### Tools :

Cleaning piece : 2-034-697-00

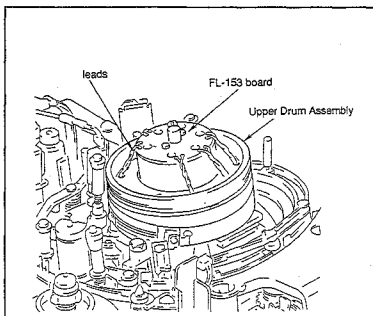
Cleaning fluid : 9-919-573-01

### Replacement flow chart



### Removal

1. Unsolder the 12 leads (UVW-1800P) or the 8 leads (UVW-1600P) connected to the FL-153 board in the center of the drum.

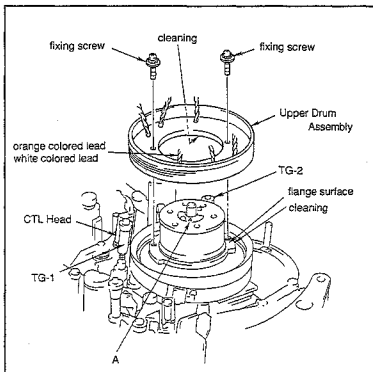


2. Remove the two screws fixing the Upper Drum. Remove the Upper Drum upward paying utmost care not to injure the TG-1 and CTL head. The toothed washers and flat washers are also taken out at the same time.

**Precaution :** When removing the Upper Drum, NEVER contact the Upper Drum with TG-1, TG-2, CTL head and Cleaning Roller.

### Installation

3. Clean the Lower Drum flange surface and the contacting surface of the new Upper Drum with cleaning piece moistened with cleaning fluid.
4. While paying utmost care not to contact with TG-1 and CTL head, install the new Upper Drum so that the orange and white leads of the Upper Drum come close to the printed letter "A" on the FL-153 board.



**Precaution 1 :** When installing the Upper Drum on the flange, pay utmost care not to injure the tape running surface of the Upper Drum or the video head.

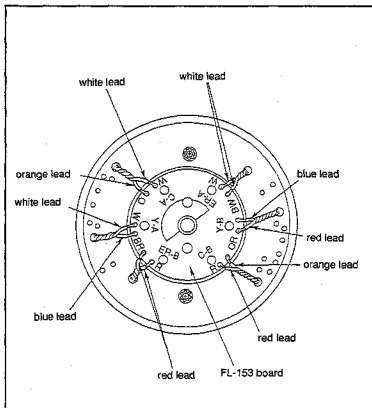
**Precaution 2 :** When installing the Upper Drum on the flange, NEVER contact the Upper Drum with TG-1, TG-2, CTL head and Cleaning Roller.

**Precaution 3 :** When installing the Upper Drum, pay attention not to reverse the mounting position.

5. Solder the 12 or 8 leads of the Upper Drum to the FL-153 board.

#### Reference :

Markings on FL-153 board	Color of Upper Drum leads
C · A · O	orange
C · A · W	white
Y · A · W	white
Y · A · B	blue
ER-B · R	red (UVW-1800P only)
ER-B · R	red (UVW-1800P only)
C · B · O	orange
C · B · R	red
Y · B · R	red
Y · B · B	blue
ER-A · W	white (UVW-1800P only)
ER-A · W	white (UVW-1800P only)



#### Adjustment after replacement

6. Perform the Upper Drum Eccentricity adjustment.  
(Refer to section 6-2-1.)
7. Tape Path Check. (Refer to section 7-3.)
8. Perform the CTL Head Height Check.  
(Refer to section 7-6.)
9. Perform the CTL Head Position Adjustment.  
(Refer to section 7-7.)
10. Perform the TC Head Position Adjustment.  
(Refer to section 7-11.)
11. Perform the Audio Head Height Check.  
(Refer to section 7-8.)
12. Perform the Audio/Timecode Head Phase Check.  
(Refer to section 7-9.)
13. Perform the Tape Path Check.  
(Refer to section 7-3.)
14. Perform the RF Switching Position Adjustment.  
(Refer to section 7-13.)
15. Perform the Picture Splitting Compensation Adjustment. (Refer to section 7-14.)
16. Perform the video system Alignment.  
(Refer to section 12.)

## 6-2-1. Upper Drum Eccentricity Adjustment

- When the Upper Drum is replaced, be sure to perform the Upper Drum eccentricity adjustment.

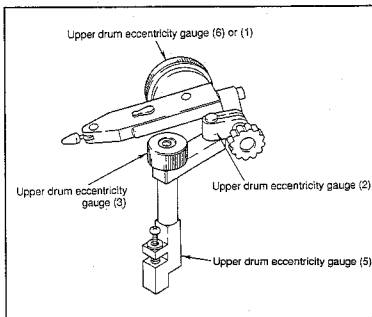
### Tools :

Upper drum eccentricity gauge (2) : J-6001-830-A  
Upper drum eccentricity gauge (3) : J-6001-820-A  
Upper drum eccentricity gauge (5) : J-6087-000-A  
Upper drum eccentricity gauge (6) : J-6325-530-A  
or (1) : J-6001-840-A  
Cleaning piece : 2-034-697-00  
Cleaning fluid : 9-919-573-01

Assemble the upper drum eccentricity gauges as shown.

### For Reference :

The drum eccentricity gauge (J-6080-038-A) and the dial gauge holder (J-6080-039-A) can be used instead of the upper drum eccentricity gauge (2), (3) and (5).

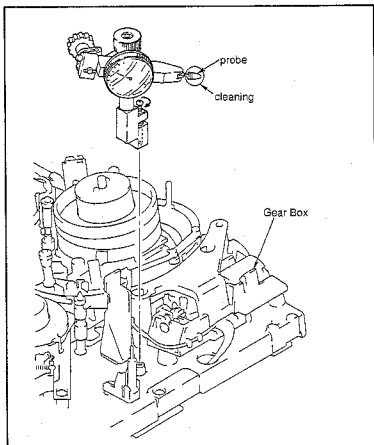


### Adjustment procedure

1. Clean the probe of the assembled upper drum eccentricity gauge with cleaning piece soaked with cleaning fluid.

**Precaution :** If a probe is employed with dust attached to it, it may injure the tape contacting surface of the Upper Drum.

2. Install the assembled eccentricity gauge in the hole on the Chassis near Gear Box.



3. Adjust the gauge position so that its probe is positioned about 5 mm from the top edge of the Upper Drum.

**Precaution :** Pay attention that the probe should not contact the video head.

4. Rotate the Upper Drum slowly clockwise. Check that the gauge reading deflection satisfies the specification.

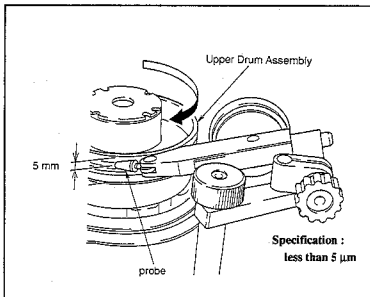
When the specification is satisfied, perform the step (6) and later.

If it does not satisfy the specification, perform the step (5) and later.

5. Adjustment required only when the specification is not satisfied.
  - (1) Rotate the Upper Drum slowly clockwise. Check the gauge reading deflection.
  - (2) Rotate the Upper Drum slowly clockwise and stop rotating at the point which gives the maximum deflection.
  - (3) Push the top of the Upper Drum contacting the probe with finger for 1/2 of the deflection. If the deflection will not move, loosen the two fixing screws and then make adjustment. If the deflection moves too easily, tighten the screws.
  - (4) Check again that the specification is satisfied.
6. Tighten the two screws alternately. Tightening torque :  $0.8\text{N}\cdot\text{m}$  (8 kgf $\cdot\text{cm}$ ).
7. Check again that the amount of upper drum eccentricity satisfies the specification.
8. Remove the upper drum eccentricity gauge.

**Precaution :** Pay attention that the probe should not contact the video head.

9. Clean the video head and the tape contacting surface of the Upper Drum with cleaning piece soaked by cleaning fluid. After cleaning, wipe the cleaning surface a few times with dry cloth.



### 6-3. DRUM ASSEMBLY REPLACEMENT

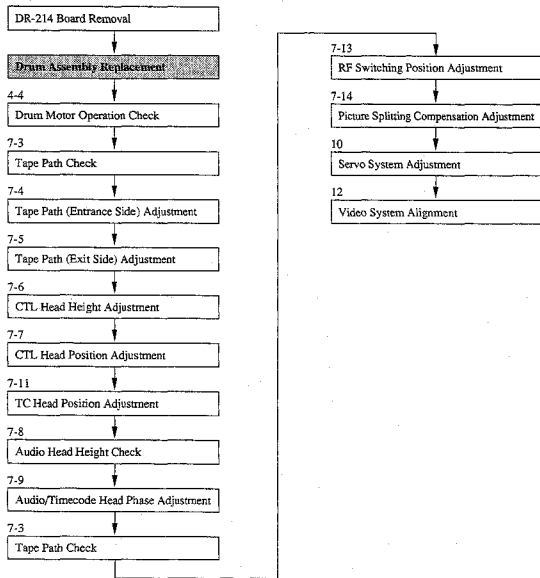
- The Drum Assembly is the periodic replacement parts. It is recommended to replace referring to the periodic replacement table.
- Replace the Drum Assembly in the following cases.
  - (1) When the rabbit guide of the lower drum has worn out, and the correct RF envelope cannot be obtained by the tape path adjustment.
  - (2) When the rabbit guide or tape contacting surface of the lower drum is injured.
  - (3) When the drum rotation is abnormal and the performance as a VTR cannot be maintained due to noise or jitter.
- The Drum Assembly includes the Upper Drum Assembly. When the Drum Assembly is replaced, the Upper Drum Assembly is also replaced at the same time.

#### Tools :

Cleaning piece : 2-034-697-00

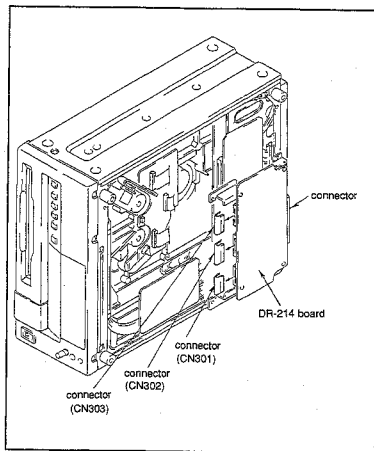
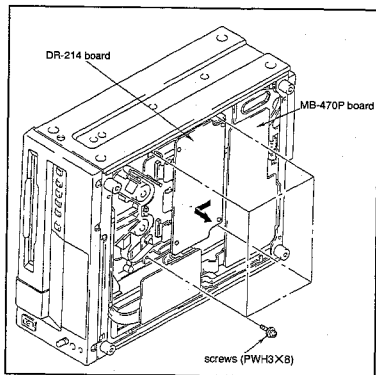
Cleaning fluid : 9-919-573-01

#### Replacement flow chart



#### Removal

1. Stand the unit with the left side bottom.
2. Remove the four screws securing the DR-214 board brackets.
3. Unplug the connector connecting the DR-214 And MB-470P boards.
4. Remove the three flexible card wires connected to the DR-214 board. (CN301, CN302, CN303)



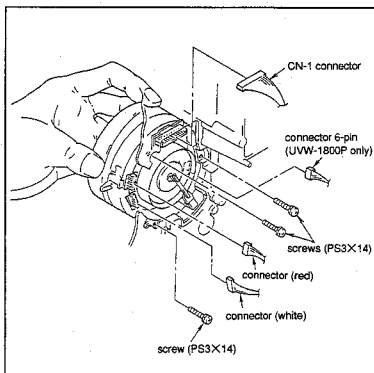


5. Remove the four connectors (UVW-1800P) or the three connectors (UVW-1600P) connected to the Drum Assembly.
6. While holding the Drum Assembly with hand from the front of the unit, remove the three screws securing the Drum Assembly from the rear of the unit.

**Precaution 1 :** Hold the Drum Assembly so as not to drop it.

**Precaution 2 :** Pay utmost attention not to injure the guides around the Drum Assembly.

7. Remove the Drum Assembly taking care so that the Drum Assembly does not contact the TG-1, TG-2, CTL head and cleaning roller.



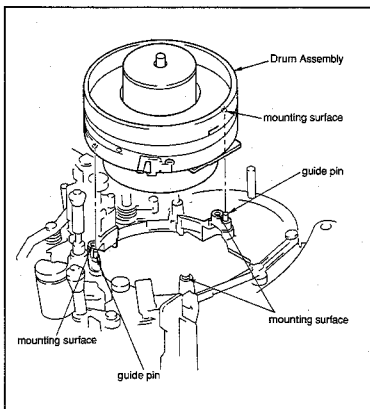
### Installation

8. Clean the mounting surface of the new Drum Assembly and the drum mounting surface of the chassis with the cleaning piece soaked with cleaning fluid.
9. Insert a new Drum Assembly in the following procedure. Make sure the Drum Assembly does not come into contact with TG-1, TG-2, CTL Head and Cleaning Roller during the course of Drum Assembly installation. Align the guide holes of the new Drum Assembly to the two guide pins of the chassis. Install the new Drum Assembly to the chassis.

**Precaution 1 :** Pay utmost care not to injure the tape running surface of the Upper Drum, video head, tape contacting surface and rabbit guide of the lower drum.

**Precaution 2 :** Pay utmost care not to contact nor injure the guides and heads around the drum.

10. Secure the new Drum Assembly with three screws.
11. Insert the connectors of the four (UVW-1800P) or three (UVW-1600P) harnesses to the Drum Assembly having the same colors.
12. Perform the works reversing the steps 4 through 1.
13. Clean the tape contacting surface of the Drum Assembly with cleaning piece soaked with cleaning fluid. After cleaning, wipe the cleaned surface a few times with dry cloth.



### Adjustment after replacement

14. Perform the Drum Motor operation check  
(Refer to section 4-4.)
15. Tape Path Adjustment  
(Refer to section 7-3, 7-4, 7-5.)
16. Perform the CTL Head Height Check.  
(Refer to section 7-6.)
17. Perform the CTL Head Position Adjustment.  
(Refer to section 7-7.)
18. Perform the TC Head Position Adjustment.  
(Refer to section 7-11.)
19. Perform the Audio Head Height Check.  
(Refer to section 7-8.)
20. Perform the Audio/Timecode Head Phase Check.  
(Refer to section 7-9.)
21. Perform the Tape Path Check.  
(Refer to section 7-3.)
22. Perform the RF Switching Position Check.  
(Refer to section 7-13.)
23. Perform the Picture Splitting Compensation Adjustment. (Refer to section 7-14.)
24. Perform the Servo System Adjustment.
25. Perform the Video System Alignment.

## 6-4. DRUM SHAFT GROUNDING ASSEMBLY REPLACEMENT

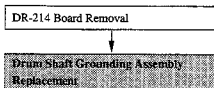
- When the Shaft Grounding Assembly worn out, the white scattered noise may appear on the monitor. Then replace the Shaft Grounding Assembly.
- Do not apply force on the Shaft Grounding Assembly nor bent it forcibly.

### Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

### Replacement flow chart



### Removal

1. Stand the unit with the left side bottom.
2. Remove the four screws securing the DR-214 board brackets. (Refer to section 6-3.)
3. Unplug the connector connecting the DR-214 And MB-470P boards.
4. Remove the screw fixing the Drum Shaft Grounding Assembly and remove it.

### Installation

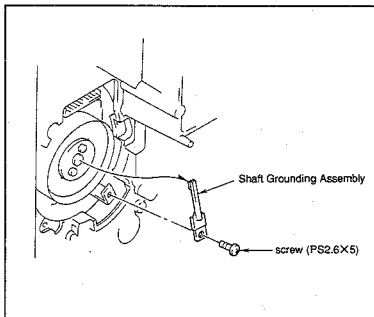
5. Clean the protruding tip at the top of new Drum Shaft Grounding Assembly with cleaning piece moistened with cleaning fluid. After cleaning, wipe the cleaned surface a few times with dry cloth.

**Precaution :** During cleaning, do not apply force on the Shaft Grounding Assembly nor bent it forcibly.

6. Clean the Shaft Grounding Assembly and its contacting surface of the Drum Assembly with cleaning piece soaked with cleaning fluid.
7. Install the Shaft Grounding Assembly so that the protruding tip at the top of Drum Shaft Grounding Assembly is positioned in the center of the contacting surface on the bottom of the Drum Assembly.

**Precaution :** During installation, do not apply force on the Shaft Grounding Assembly nor bent it forcibly.

8. Perform the works reversing the steps 3 through 1.



## 6-5. REEL TABLE ASSEMBLY REPLACEMENT

- The Reel Table Assembly replacement procedure is common to the take-up reel table and supply reel table.

### Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Allen wrench (1.5 mm diagonally)	: 7-700-736-05

### Replacement flow chart

6-5-1

Reel Cover Removal

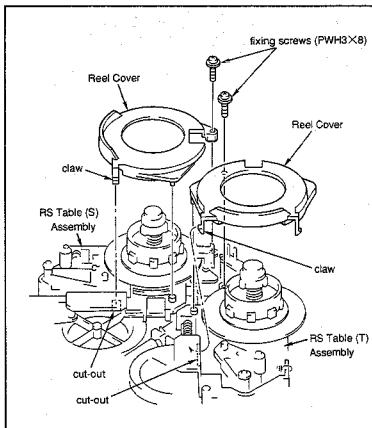
Reel Table Assembly Replacement

6-5-2

Reel Table Height Check/Adjustment

### 6-5-1. Reel Cover Removal

1. Remove the screw fixing the Reel Cover.
2. Unlock the Reel Cover claw from the cut-out of the RS Table (S, T) Assembly. Remove it upward.



### Removal

1. As viewed the Reel Table Assembly from the top, insert a L shaped wrench from the side into the square holes (two points). Loosen the set screws (two points) of the Reel Table.

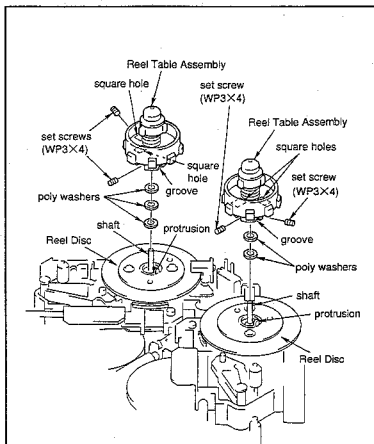
**Precaution :** Poly slider washers are inserted at the bottom of Reel Table bearing. This is for height adjustment of Reel Table. When removing a reel table, the poly slider washer may adhere to the bottom of the Reel Table. Take care not to lose the poly slider washers.

2. Remove the Reel Table Assembly with finger.
3. Perform the same procedure as the step 1 on the other Reel Table. Loosen the set screw and remove the Reel Table.

### Installation

4. Insert a new Reel Table Assembly into the shaft to match the Reel Disc protrusion with the groove of the new Reel Table Assembly.

**Precaution :** Tighten the set screws of each Reel Table Assembly after reel height is confirmed.



## 6-5-2. Reel Table Height Check / Adjustment

- When a Reel Motor is replaced or a Reel Table is removed or replaced, perform this item.
- For stable tape run, the supply reel table is positioned 0.25 mm higher than what is adjusted by the reel table height gauge. The take up reel table is positioned 0.13 mm higher than what is adjusted by the reel table height gauge.
- The reel table height adjustment establishes the references of tape path system. Pay utmost attention in this adjustment.

### Tools :

Cassette reference plate (L)	: J-6320-880-A
Reel table height gauge	: J-6320-680-A
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
L shaped wrench (across flat has 1.5 mm)	: 7-700-736-05

### Check procedure

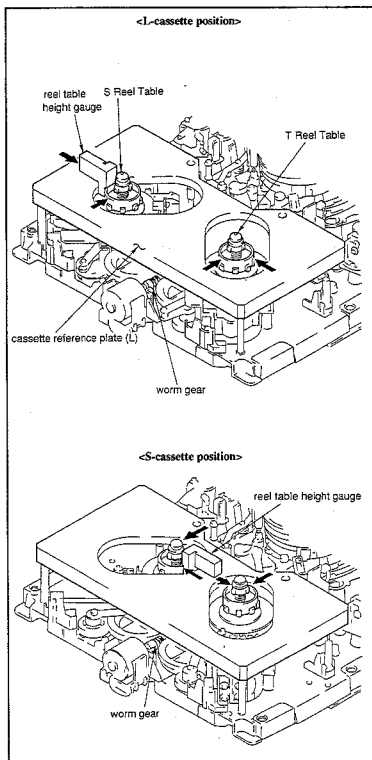
1. Confirm that the machine is in the unthreaded end position.
2. Rotate the worm gear with finger to set the Reel Table in the L-cassette position.
3. Clean the surface of the cassette reference plate (L) with cleaning piece moistened with cleaning fluid.
4. Place the cassette reference plate in the position where a cassette is located.
5. Clean the surface of the reel table height gauge with cleaning piece moistened with cleaning fluid.
6. Move the reel table height gauge from the two directions as shown by the arrow toward the supply or take-up reel tables to check that the specifications are satisfied.

**Specifications 1 :** The \* marked portion of the gauge passes the flange of the reel table.

**Specifications 2 :** The \* \* marked portion of the gauge is blocked by the flange of the reel table.

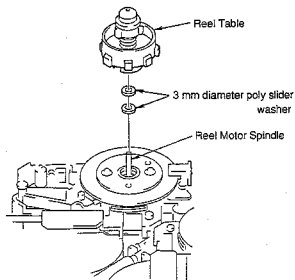
7. Rotate the worm gear with finger to set the Reel Table in the S-cassette position.
8. Perform the step 6 again. Confirm that the specifications are satisfied.

If any of the specification is not satisfied, perform the adjustment shown in step 9 and later until the specifications are satisfied in both L- and S-cassette positions. When the specifications in both L- and S-cassette positions are satisfied, go to step 11 and later.

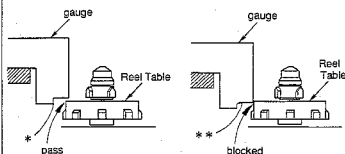


#### Adjustment procedure

9. Remove the Reel Table.
10. Exchange the poly slider washer inserted in the reel motor spindle. Select combination of appropriate thickness of poly slider washers until the specifications in both L- and S-cassette positions are satisfied.  
adjustment poly slider washers (3 mm diameter)  
0.13 mm thick : 3-701-439-01  
0.25 mm thick : 3-701-439-11  
0.5 mm thick : 3-701-439-21
11. After the step 10 is completed, remove the supply reel table once. Add a poly slider washer of 0.25 mm thick under the reel table.
12. After the step 10 is completed, remove the take-up reel table once. Add a poly slider washer of 0.13 mm thick under the reel table.
13. While pushing the supply and take-up reel tables downward, tighten the two reel table fixing screws with L shaped wrench.



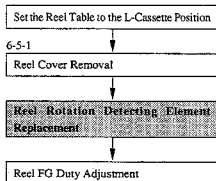
#### Specifications :



## 6-6. REEL ROTATION DETECTING ELEMENT REPLACEMENT

- The Reel Rotation Detecting Element replacement procedure is common to take-up side and supply side.

### Replacement flow chart



### Removal

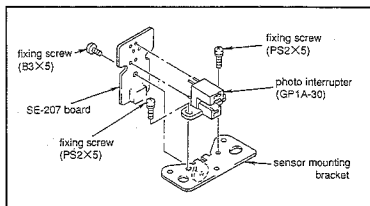
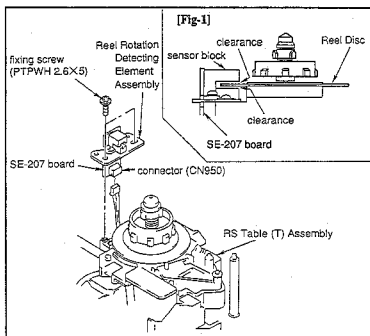
1. Set the Reel Table to the L-cassette position. (Refer to section 6-5.)
2. Remove the reel cover. (Refer to section 6-5-1.)
3. Remove the two screws fixing the Reel Rotation Detecting Element. Remove it not to collapse with the reel disc.
4. Unplug the connector (CN950) which is connected to the Reel Rotation Detecting Element.
5. Remove a screw fixing SE-207 board.
6. Remove the two fixing screws. Remove SE-207 board from the sensor mounting bracket.
7. Unsolder the photo interrupter which is soldered on the SE-207 board.

### Installation

8. Connect by soldering the new photo interrupter (GP1A-30) on the SE-207 board.
9. Attach the photo interrupter to the sensor mounting bracket using two screws.
10. Attach the SE-207 board to the sensor mounting bracket using a screw.
11. Confirm that clearance exists between the sensor block and the reel disc. (Refer to Fig-1)

### Adjustment after replacement

12. Reel FG Duty Adjustment. (Refer to section 4-5.)





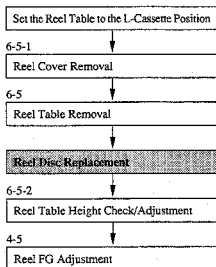
## 6-7. REEL DISC REPLACEMENT

- When a Reel Disc is injured or deformed, replace the reel disc.
- The Reel Disc replacement procedure is common to take-up side and supply side.

### Tools :

L shaped wrench (across flat has 1.5 mm)	: 7-700-736-05
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01

### Replacement flow chart



### Removal

1. Rotate the worm of the LS motor to set the L-Reel Table to the L-cassette position.  
(Refer to section 6-5.)
2. Remove the reel cover. (Refer to section 6-5-1.)
3. Remove the Reel Table. (Refer to section 6-5.)

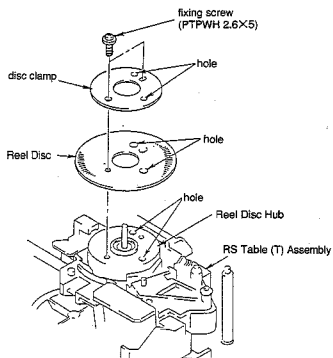
4. Remove the two screws fixing the Reel Disc. Remove the Reel Disc from the reel hub.

#### Installation

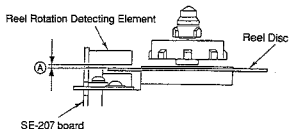
5. Install a new Reel Disc onto the reel disc hub together with the disc clamp aligning the holes. Take care not to deform the new Reel Disc during installation.
6. Clearance between the Reel Rotation Detecting Element and Reel Disc must satisfy the specifications. (Refer to Fig-1)
7. Install the Reel Table. (Refer to section 6-5.)

#### Adjustment after replacement

8. Check the reel height. (Refer to section 6-5.)
9. Perform the Reel FG Duty Adjustment. (Refer to section 4-5.)
10. Attach the Reel Cover. (Refer to section 6-5-1.)



[Fig-1] Specifications :  $0.3 \text{ mm} \leq \textcircled{A} \leq 0.7 \text{ mm}$



## 6-8. RS TABLE ASSEMBLY REPLACEMENT

- The Reel Motor Plate replacement procedure is common to take-up side and supply side.

**Mode :** Unthreaded end condition

**Tools :**

L shaped wrench (across flate has 1.5 mm)	
	: 7-700-736-05
Grease (SGL-505)	: 7-602-010-04
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01

**Replacement flow chart**

6-5-1

Reel Cover Removal



Reel Table Removal



RS Table Assembly Replacement



6-8-1

Cassette Support Stud (S) Height Check/  
Adjustment



6-5-2

Reel Table Height Check/Adjustment



4-4

Reel Motor Operation Check



4-5

Reel FG Duty Adjustment



4-5

S Reel Offset/Friction Adjustment  
or  
T Reel Offset/Friction Adjustment



4-5

S Reel Torque Adjustment  
or  
T Reel Torque Adjustment

## Removal

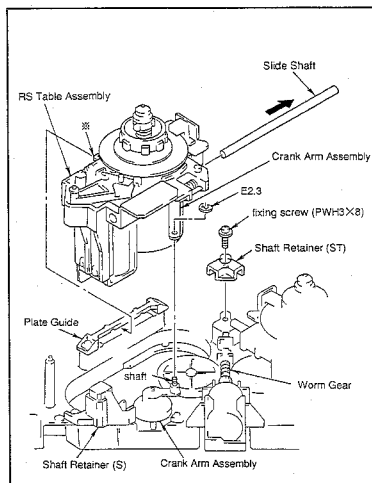
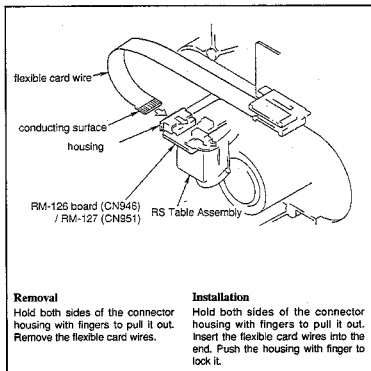
1. Stand the machine in vertical position with its side in the bottom. Remove the flexible card wire from CN946 (supply side) of RM-126 board or CN951 (take-up side) of RM-127 board of the RS Table Assembly.
2. Return the machine into horizontal position. Rotate the worm gear with finger as shown to move the Reel Table in between the S-cassette and L-cassette positions.  
(Rotating clockwise as viewed from front of the machine moves it toward S-cassette position. Rotating counter-clockwise move toward the L-cassette position.)
3. Remove the Reel Cover.  
(Refer to section 6-5-1.)
4. Remove the E-rings (E2.3) securing RS Table Assembly and Crank Arm Assembly.
5. Remove the screw as shown to remove the Shaft Retainer (ST).
6. Loosen the two screws securing the Shaft Retainer (S) or (T) to extract the Slide Shaft from the Shaft Retainer (S) or (T).

**Precaution :** Pay utmost care not to injure the Slide Shaft when extracting the Shaft.

7. Remove the RS Table Assembly and the Slide Shaft together.
8. Push the Slide Shaft in the direction of arrow to remove it from the RS Table Assembly.

## Installation

9. Clean the hole of the new RS Table Assembly where the Slide Shaft passes. Clean the area below the \* marked portion. Use the cleaning piece soaked with cleaning fluid.
10. Clean the Slide Shaft with the cleaning piece soaked with cleaning fluid.

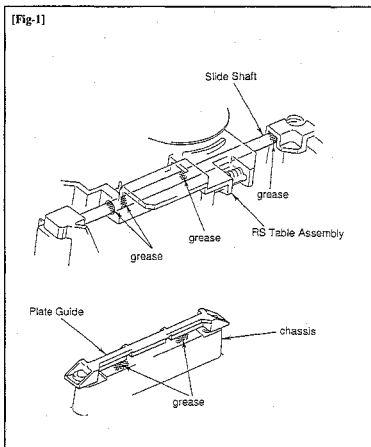


11. Insert the Slide Shaft into the hole of the RS Table Assembly.
12. Insert the \* marked portion of the RS Table between the Plate Guide and chassis. Insert the Slide Shaft between the Shaft Retainer (S) or (T).
13. Fix the opposite end of the Slide Shaft using the Shaft Retainer (ST) and fixing screw. The Slide Shaft is now fixed.
14. Tighten the two screws fixing the Shaft Retainer (S) or (T).
15. Move the RS Table Assembly with finger to the right and left. Check that it moves freely.
16. Fix the arm of the RS Table Assembly onto the Crank Arm Assembly using E-ring.
17. Apply grease on the Slide Shaft and chassis. (Fig-1)
18. Stand the machine in vertical position with the side in the bottom. Insert the flexible card wire to CN946 (supply side) of RM-126 board or CN951 (take-up side) of RM-127 board of the RS Table Assembly.

#### Adjustment after replacement

19. Perform the Cassette Support Stud (S) Height Check/Adjustment  
(Refer to section 6-8-1.)
20. Perform the Reel Table Height Check/Adjustment  
(Refer to section 6-5-2.)
21. Install the Reel Cover.  
(Refer to section 6-5-1.)
22. Check the Reel Motor operation.  
(Refer to section 4-4.)
23. Perform the Reel FG Duty Adjustment.  
(Refer to section 4-5.)
24. Perform the S Reel Offset/Friction Adjustment or  
T Reel Offset/Friction Adjustment  
(Refer to section 4-5.)
25. Perform the S Reel Torque/T Reel Torque Adjustment  
(Refer to section 4-5.)

[Fig-1]



### 6-8-1. Cassette Support Stud (S) Height Check/Adjustment

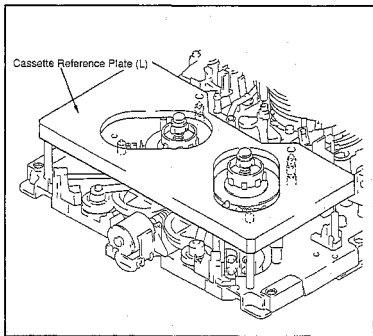
- This item is usually not necessary. When the RS Table Assembly is replaced, be sure to perform this item.

#### Tools :

Cassette reference plate (L)	: J-6320-880-A
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Adjustment mirror	: J-6080-029-A
L shaped wrench (across flat has 1.5 mm)	: 7-700-736-05

#### Check procedure

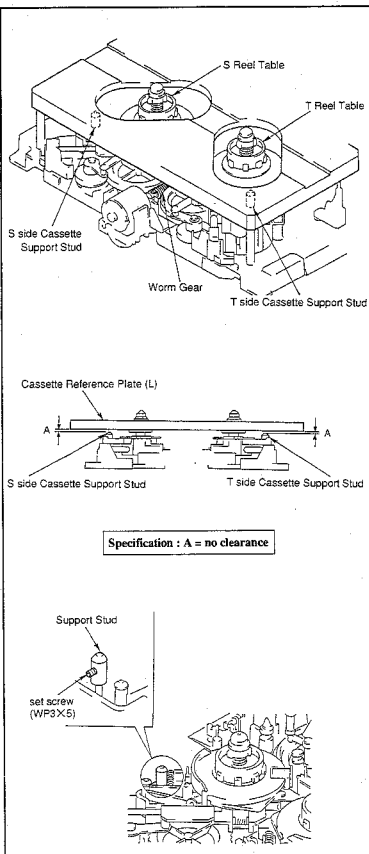
1. Confirm that the machine is in the unthreaded end position.
2. Clean the surface of the cassette reference plate with cleaning piece soaked with cleaning fluid.
3. Plate the cassette reference plate (L) in the position where cassette is positioned.



4. Rotate the worm gear with finger so that the Reel Table is positioned in the middle between the S-cassette position and L-cassette position.  
(Rotating clockwise as viewed from the front of the machine moves the Reel Table toward the S-cassette position. Rotating counter-clockwise moves toward the L-cassette position.)  
Confirm that the S side Cassette Support Stud and the T side Cassette Support Stud are located under the Cassette Reference Plate (L). (The S side Cassette Support Stud and the T side Cassette Support Stud must not be visible from the top of the machine.)
5. Turn the Cassette Reference Plate (L) upside down and place it in the position where cassette is place.
6. Confirm that there is no clearance between the Cassette Reference Plate (L) and S side Cassette Support Stud, and also between the Cassette Reference Plate (L) and the T side Cassette Support Stud, using Adjustment mirror.  
If the specification is not satisfied, perform the following step 7 and later.

#### Adjustment procedure

7. Loose the screws fixing the T side Cassette Support Stud/T side Cassette Support Stud, by 1/2 to 1 turn using L shaped wrench.
8. Lift up the S side Cassette Support Stud and the T side Cassette Support Stud to contact with the Cassette Reference Plate (L). Tighten the screw with L shaped wrench.
9. Check that the specification is satisfied.



## 6-9. REEL MOTOR REPLACEMENT

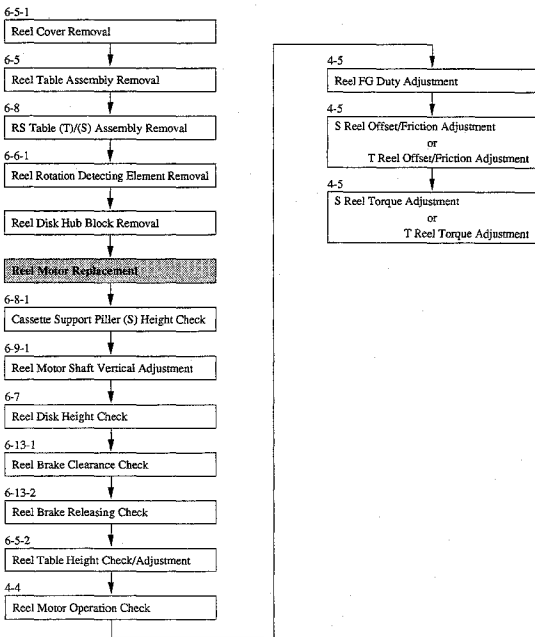
- Replace the Reel Motors on the T side and S side in the same procedure.

Mode : Unthreading end mode

### Tools :

L shaped wrench (across flat has 1.5 mm) : 7-700-736-05  
Cleaning piece : 2-034-697-00  
Cleaning fluid : 9-919-573-01

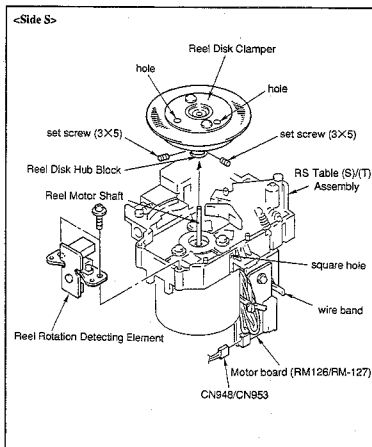
### Replacement flow chart





## Removal

1. Rotate the Worm Gear of the LS Motor manually so that the RS Table Assembly (T)/(S) is centered between the L and S cassette positions.  
(When the gear is turned clockwise as viewed from the front of the unit, the RS Table (T)/(S) Assembly is moved to the S cassette position, and when the gear is turned counterclockwise, the RS Table (T)/(S) Assembly is moved to the L cassette position.)
2. Remove the Reel Cover.  
(Refer to section 6-5-1.)
3. Remove the Reel Table.  
(Refer to section 6-5.)
4. Remove the RS Table (T)/(S) Assembly.  
(Refer to section 6-8.)
5. Remove the Reel Rotation Detecting Element.  
(Refer to section 6-6-1.)
6. Using the holes (two points) of the Reel Disk Clamp as a guide, put the L shaped wrench into the square hole of the RS Table (T)/(S) Assembly to turn the two set screws on the Reel Disk Hub Block a 1/2 or 1 rotation and remove the Reel Disk Hub Block from the motor shaft.
7. Cut the wire band.
8. Disconnect the RM-126 (CN948 for RS Table (S) Assembly) or RM-127 (CN953 for RS Table (T) Assembly) connector from the motor board.



9. Remove the three set screws from the Reel Motor Plate Assembly and remove the Reel Motor.

**Precaution :**

Do not lose the Reel Motor Shaft Vertical Adjustment Spacers when removing the Reel Motor.

When attaching the motor again, restore the same number of Spacers to the same positions, and perform the Reel Motor Shaft Vertical Adjustment. There are two kinds of Spacers which have different thickness.

**Installation**

10. Clean the surfaces of the new Reel Motor and Reel Motor Plate Assembly with the cleaning piece moistened with the cleaning fluid.
11. Install the Reel Motor to the Reel Motor Plate Assembly in the direction as illustrated in the figure with three screws.

**Precaution :**

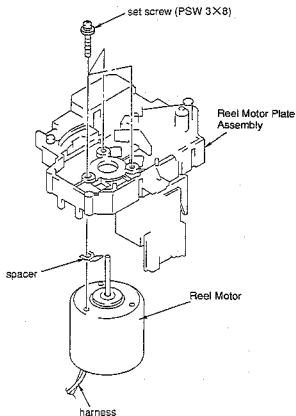
- Restore the spacers as they were.
- Tighten the three screws with the same torque.

12. Connect the connector of the Reel Motor Harness to RM-126 (CN948) or RM-127 (CN953).
13. Fasten the Reel Motor harness with another harnesses using the wire band.
14. Install the RS Table (T)/(S) Assembly.  
(Refer to section 6-8.)

**Adjustment after Replacement**

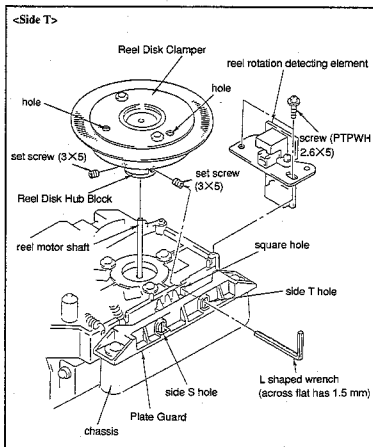
15. Check the Cassette Support Pillar (S) Height.  
(Refer to 6-8-1.)
16. Perform the Reel Motor Shaft Vertical Adjustment.  
(Refer to 6-9-1.)

<Side S>



## Installation

17. Install the Reel Disk Hub Block to the Reel Motor Shaft, and align the direction of the hole of the Reel Disk Clamp to the square hole of the RS table (T)/(S) Assembly.
18. Install the Reel Rotation Detecting Element.  
(Refer to section 6-6-1.)
19. Insert the L shaped wrench from the side S hole for the RS Table (S) Assembly and from the side T hole for the RS Table (T) Assembly.
20. Adjust the Reel Disk height.  
(Refer to section 6-7.)
21. Check the Reel Brake clearance.  
(Refer to section 6-13-1.)
22. Check the Reel Brake Releasing.  
(Refer to section 6-13-2.)
23. Install the Reel Table.  
(Refer to section 6-5.)
24. Check the Reel Table height.  
(Refer to section 6-5-2.)
25. Check the Reel Motor operation.  
(Refer to section 4-4.)
26. Adjust the Reel FG Duty.  
(Refer to section 4-5.)
27. Adjust the S Reel Offset/Friction or T Reel Offset/Friction.  
(Refer to section 4-5.)
28. Adjust the S Reel Torque or T Reel Torque.  
(Refer to section 4-5.)



### 6-9-1. Reel Motor Shaft Vertical Adjustment

- The procedure of the Reel Motor Shaft vertical adjustments of side S and side T are the same.
- Perform this Reel Motor Shaft vertical adjustment whenever the Reel Motor is replaced.
- If this adjustment is not performed properly, the reel hub touches the case in the cassette tape and the noise occurs or the tape may be damaged because the tape is not passed properly.

**Mode :** Unthreading end mode

#### Tools :

Cassette reference plate (L)	: J-6320-880-A
Reel motor shaft slantness check jig	: J-6150-960-A
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Wire clearance check gauge	: J-6152-450-A

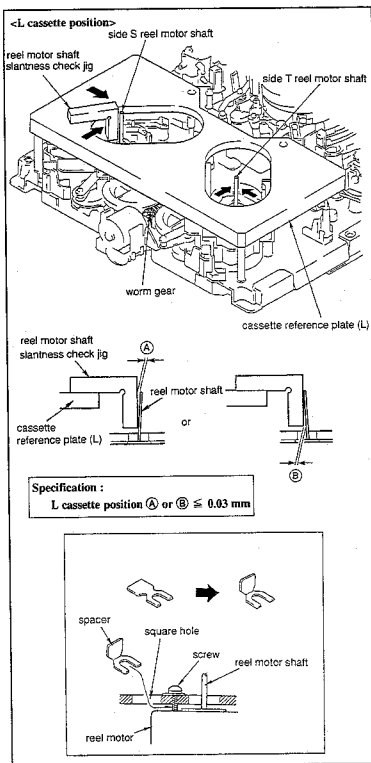
#### Adjustment Procedure

1. Rotate the Worm Gear manually to locate the Reel Motor axis to the L cassette position.
2. Put the cassette reference plate (L) to where the cassette is located.
3. Put the reel motor shaft slantness check jig to the side S or side T Reel Motor Shaft from the directions of the two arrows in the figure, and check that the clearance between the Reel Motor Axis and adjustment tool satisfies specification A or B.
4. If the specification is not satisfied, rotate the screw fixing the Reel Motor one or two rotations to loosen. Adjust the number of the spacers in the place where the Reel Motor is attached to satisfy the specification.
5. Bent a spacer as illustrated in the figure. Pick the spacer up with the tweezers, and insert the spacer between the chassis and motor through the square hole of the Reel Motor Plate Assembly.

#### Spacer

3-182-285-01	Thickness : 0.02 mm
3-182-285-11	Thickness : 0.05 mm

6. Tighten the three screws fixing the Reel Motor with the same torque.



## 6-10. REEL POSITION MOTOR REPLACEMENT

### Tool :

L shaped wrench (across flat has 1.5 mm) : 7-700-736-01

### Replacement flow chart

3-6

Front Panel Removal



Reel Position Motor Replacement

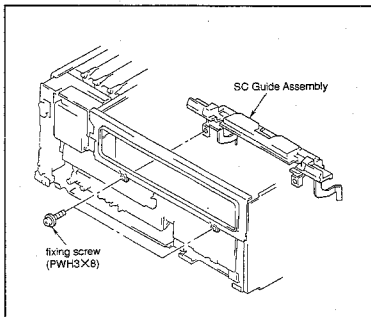


4-4

Reel Position Motor Operation Check

### Removal

1. Remove the Front Panel. (Refer to section 3-6.)
2. Remove the two screws fixing the SC Guide Assembly.



3. Cut the tie band clamping the harnesses of CN351 and CN352 of the MS-39 board from the rear of the unit and remove CN352 from MS-39 board.
4. Release the motor harness from the two claws of the base.
5. Loosen the set screw (2.6×3) fixing the motor joint 1/4 to 1/2 turn.

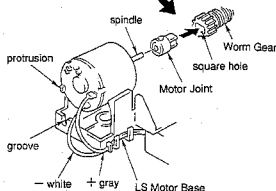
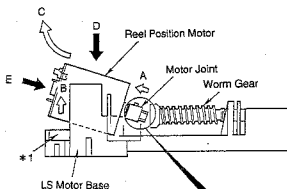
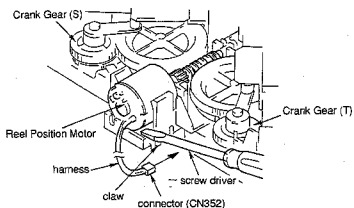
6. While pushing the motor joint fully in the direction A, insert a flat (-) head screw driver tip in the \*1 marked portion to raise in the direction B.
7. Extract the Reel Position Motor in the direction of arrow C.
8. Unsolder the harness connected to the reel position motor.

#### Installation

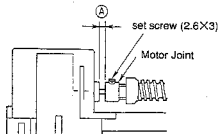
9. Connect the harness to a new Reel Position Motor by soldering.
10. Insert a motor joint into the Reel Position Motor spindle. Hold them with hand and slant them. Align the motor protrusion with the groove of the LS Motor Base. Push them in from the direction of arrow D.
11. Align the motor joint with the square hole of the Worm Gear. Push in the Reel Position Motor from the direction of arrow E.
12. Fix the motor joint with set screw at the position satisfying the specification as shown.
13. Rotate the motor joint with finger and check that it rotates light.
14. Hook the harness on the two claws on the base.
15. Connect the CN352 to MS-39 board on the rear of the unit. Tie the harness with the CN352 harness.

#### Adjustment after replacement

16. Perform the Reel Position Motor Operation Check. (Refer to section 4-4.)



Specification :  $\textcircled{A} = 2 \pm 0.1 \text{ mm}$



## 6-11. WORM GEAR REPLACEMENT (REEL POSITION MOTOR)

**Mode :** Unthread end mode

### Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Sony grease (SGL-505)	: 7-622-010-04
Sony oil (NT-68)	: 7-661-018-18

### Replacement flow chart

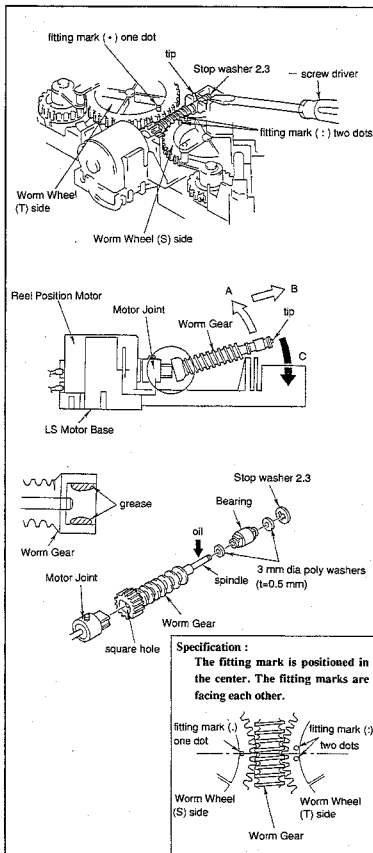
#### Worm Gear Replacement

#### Removal

1. Slant a flat (-) head screw driver and insert it into the tip of the Worm Gear as shown. Raise the Worm Gear in the direction of arrow A.
2. Extract the Worm Gear in the direction of arrow B.
3. Remove the Stop washer 2.3 from the Worm Gear. Remove 3 mm dia poly washer (t=0.5 mm) and bearing.

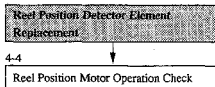
#### Installation

4. Clean shaft of a new Worm Gear with a cleaning piece moistened with cleaning fluid.
5. Apply a drop of Sony oil between the Worm Gear bearings as shown. Coat Sony grease thin on the square hole of the Worm Gear.
6. Rotate the Worm Wheel with finger until the fitting mark on the supply side Worm Wheel and that on the take-up side are facing each other.
7. Slant the Worm Gear so that the motor joint fits the square hole of the Worm Gear.
8. Push in the tip of the Worm Gear with finger in the direction of arrow C until it locks.
9. Check that the fitting marks on the supply side Worm Wheel and that on the take-up side satisfy the specification.



## 6-12. REEL POSITION DETECTOR ELEMENT REPLACEMENT

### Replacement flow chart



### Removal

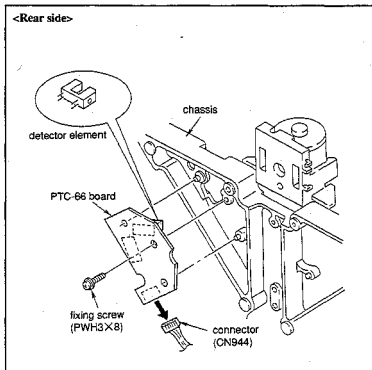
1. Remove the screw securing the board (PTC-66) on which reel position detector element is mounted from the rear of the unit.
2. Remove the harness coming from PTC-66 board from the connector (CN944).
3. Unsolder the detector element to remove it from the PTC-66 board.

### Installation

4. Solder a new reel position detector element fitting with the polarity printed on the PTC-66 board.
5. Insert the harness into the connector (CN944) on the PTC-66 board.  
Install the PTC-66 board to the chassis.

### Adjustment after replacement

6. Perform the Reel Position Motor Operation Check.  
(Refer to section 4-4.)

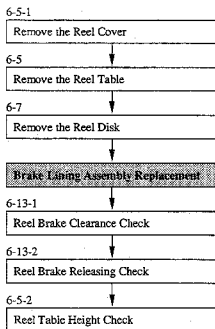




### 6-13. BRAKE LINING ASSEMBLY REPLACEMENT

- When power is turned ON or OFF, the T reel brake lining and S reel brake lining are pressed against the T and S reel tables.
- When a cassette is inserted with the power switch turned ON, the T and S brake linings are detached from the reels. Only the Supply reel brake lining is pressed against the S reel table during threading, unthreading mode and while threading ring is rotating.
- Both the T and S reel brake linings are kept detached in the PLAY, STOP, REW, F.FWD, SEARCH and REV modes.
- When EJECT button is pressed, the EJECT mode is started. In a few seconds after EJECT mode is completed, the T and S reel brake linings are pressed against the reel tables.

#### Replacement flow chart



### Removal

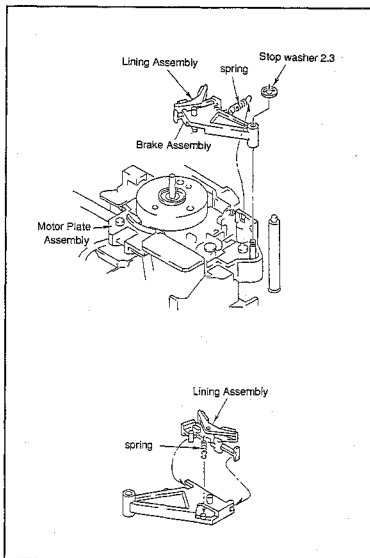
1. Remove the Reel Cover. (Refer to section 6-5-1.)
2. Remove the Reel Table. (Refer to section 6-5.)
3. Remove the Reel Disk. (Refer to section 6-7.)
4. Remove the spring of the Brake Assembly from the Motor Plate Assembly as shown.
5. Remove the Stop washer 2.3 fixing the Brake Assembly. Remove the Brake Assembly.
6. Remove the spring of the Lining Assembly from the Brake Assembly.

### Installation

7. Install a new Brake Lining Assembly by reversing the steps 5 and 6.

### Adjustment after replacement

8. Perform the Reel Brake Clearance Check.  
(Refer to section 6-13-1.)
9. Perform the Reel Brake Releasing Check.  
(Refer to section 6-13-2.)
10. Perform the Reel Table Installation.  
(Refer to section 6-5.)
11. Perform the Reel Table Height Check  
(Refer to section 6-5-2.)

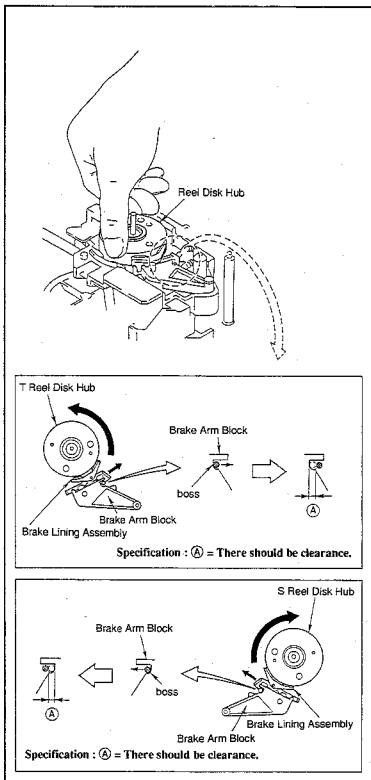


### 6-13-1. Reel Brake Clearance Check

- When Brake Assembly, Lining Assembly or Reel Disk Hub is replaced, be sure to perform the Reel Brake Clearance Check.

#### Check procedure

1. Hold the takeup reel Disk Hub with finger. Check that there is clearance between Brake Arm Block and boss when the Disk Hub is rotated counter-clockwise.  
If there is no clearance replace the new Brake lining Assembly.
2. Hold the supply reel Disk Hub with finger. Check that there is clearance between Brake Arm Block and boss when the Disk Hub is rotated clockwise.  
If there is no clearance replace the new Brake lining Assembly.

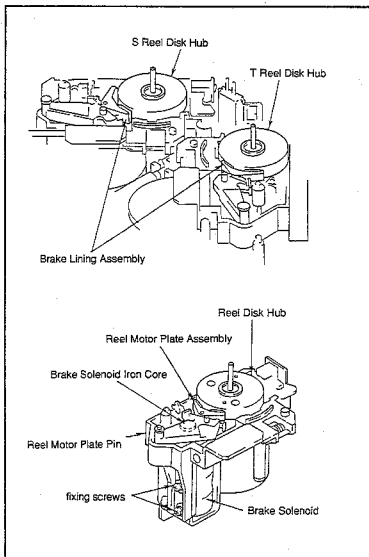


### 6-13-2. Reel Brake Releasing Check

- When a Brake Assembly, Lining Assembly or Reel Disk Hub is replaced, be sure to perform the Reel Brake Releasing Check.
- When a Brake Solenoid Block is replaced or adjusted, be sure to perform the Reel Brake Releasing Check.

#### Check procedure

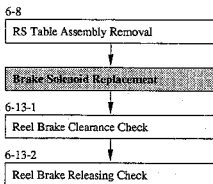
1. Turn off the power.
2. Check that the Brake Lining Assembly is not contacting with the take-up reel table when take-up reel is rotating.  
If this specification is not satisfied, check the Brake Assembly and Brake Solenoid Block.
3. Check that the Brake Lining Assembly is not contacting with the supply reel table when supply reel is rotating.  
If this specification is not satisfied, replace the Brake Assembly and Brake Solenoid Block.



## 6-14. BRAKE SOLENOID REPLACEMENT

- The Brake Solenoid replacement procedure is common to take-up side and supply side.

### Replacement flow chart



### Removal

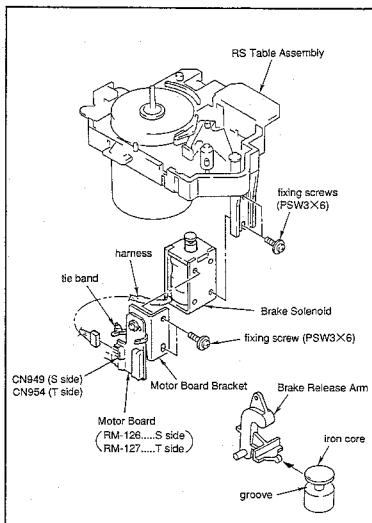
1. Remove the RS Table from the unit following the "RS Table Assembly Replacement". (Refer to section 6-8.)
2. Cut the tie band holding the Motor Board RM-126 (S side) or RM-127 (T side).
3. Unplug the harness coming from the Brake Solenoid from the Motor Board connector CN949 (S side) or CN945 (T side).
4. Remove the two screws from the Motor Board bracket. Remove the Motor Board.
5. Remove the two screws fixing the Brake Solenoid from the RS Table Assembly. Remove the Brake Solenoid.

### Installation

6. Insert the groove of the new Brake Solenoid's iron core to the Brake Release Arm. Secure it with the two fixing screws.
7. Reverse the steps 4 through 1 of the removal for installation.

### Adjustment after replacement

8. Perform the Reel Brake Clearance check. (Refer to section 6-13-1.)
9. Perform the Reel Brake Releasing Check. (Refer to section 6-13-2.)



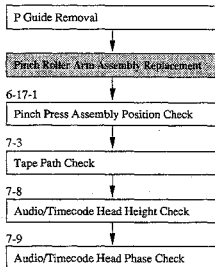
## 6-15. PINCH ROLLER ARM ASSEMBLY REPLACEMENT

- When the Pinch Roller has worn out or is damaged, replace it as the Pinch Roller Arm Assembly.
- The Pinch Roller is the periodic replacement parts. It is recommended to use the periodic inspection table.

### Tools :

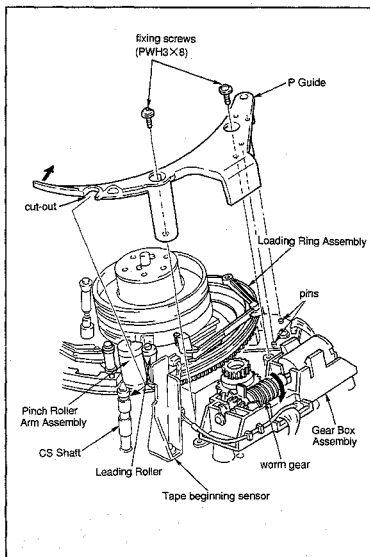
- Cleaning piece : 2-034-697-00  
Cleaning fluid : 9-919-573-01

### Replacement flow chart



### Removal

1. Remove two fixing screws. Remove the P Guide from the CS shaft by pulling its cut-out in the direction of arrow.
2. Rotate the worm gear of the Gear Box Assembly with finger until the Leading Roller of the Loading Ring Assembly comes beside to the tape beginning sensor.



3. Remove the Stop washer 2.3 from the top of the Pinch Roller Assembly. Remove the Pinch Roller Assembly from the Loading Ring Assembly

#### Installation

4. Apply a drop of the Sony oil on the surface of Pinch Roller Shaft. (Refer to Fig-2)
5. Install the Pinch Return Spring to the Pinch Roller Shaft of the Loading Ring Assembly with its longer end on the top. Push fully the portion "A" of the spring toward the direction of the arrow C.
6. Install a new Pinch Roller Arm Assembly to the Pinch Roller Shaft as shown so that the portion "A" of the Pinch Return Spring is hooked on the Arm Base. (Refer to Fig-1)
7. Push up the portion "B" of the Pinch Return Spring to hook it on the spring stay of the Loading Ring Assembly
8. Secure the Pinch Roller Arm Assembly with the Stop washer 2.3.
9. Move the Pinch Roller Arm Assembly in the direction of arrow D. Check that it returns to the home position smoothly when it is unhandued.

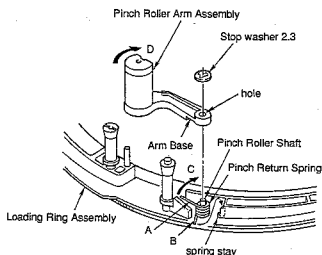
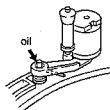
#### Adjustment after replacement

10. Perform the Pinch Press Assembly Position Adjustment (Refer to section 6-17-1.)
11. Perform the Tape Path Check (Refer to section 7-3.)
12. Perform the Audio/Timecode Head Height Check. (Refer to section 7-8.)
13. Perform the Audio/Timecode Head Phase Check (Refer to section 7-9.)

[Fig-1]

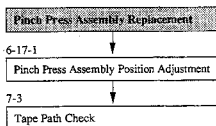


[Fig-2]



## 6-16. PINCH PRESS ASSEMBLY REPLACEMENT

### Replacement flow chart



### Removal

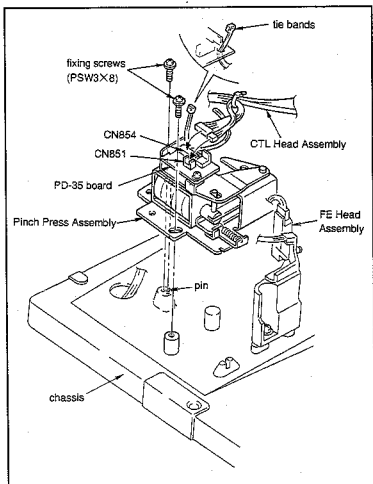
1. Cut the tie band holding the PD-35 board.
2. Unplug the two connectors (CN851, CN854) from the PD-35 board.
3. Remove the two screws securing the Pinch Press Assembly. Remove the Pinch Press Assembly from chassis.

### Installation

4. Align the hole of a new Pinch Press Assembly with the pin on the chassis and install it with two fixing screws.
5. Insert the two connectors (CN851, CN854) to the mating connectors of the PD-35 board.
6. Clamp the harnesses of the Pinch Press Assembly, CTL Head Assembly and FE Head Assembly on the PD-35 board with tie band.

### Adjustment after replacement

7. Perform the Pinch Press Assembly Position Adjustment. (Refer to section 6-17-1.)
8. Perform the Tape Path Check. (Refer to section 7-3.)





## 6-17. PINCH SOLENOID REPLACEMENT

### Replacement flow chart

6-16

Pinch Press Assembly Removal



Pinch Solenoid Replacement



6-17-1

Pinch Press Assembly Position Adjustment



7-3

Tape Path Check

### Removal

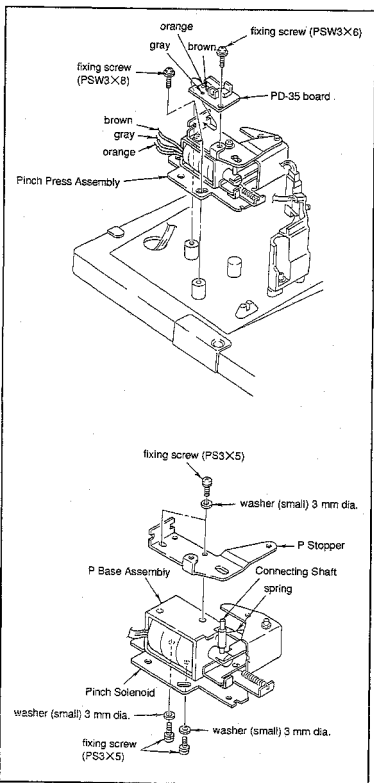
1. Remove the Pinch Press Assembly.  
(Refer to section 6-16.)
2. Remove the screw securing the PD-35 board. Unsolder the three leads (orange, gray, brown) coming from the Pinch Solenoid to the PD-35 board.
3. Remove the two screws (PS3×5) and washers as shown and remove the P Stopper.
4. Extract the Connecting Shaft.
5. Remove the two screws and washers and remove the Pinch Solenoid from the P Base Assembly.

### Installation

6. Install a new Pinch Solenoid on the P Base Assembly using the screws (PS3×5) via washers (small) as shown.
7. Reverse the above steps 4 through 1 of removal to install a new Pinch Solenoid.

### Adjustment after replacement

8. Perform the Pinch Press Assembly Position Adjustment. (Refer to section 6-17-1.)
9. Perform the Tape Path Check.  
(Refer to section 7-3.)



### 6-17-1. Pinch Press Assembly Position Adjustment.

**Mode :** Thread the unit without inserting a cassette. Keep the PLAY mode.

(The mode in which the Pinch Roller is pressed.)

**Tool :**

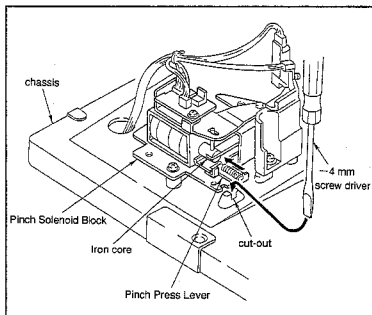
Thickness gauge : 9-911-053-00

**Check procedure**

1. Check that the clearance between the Pinch Press Lever and Pinch Limiter satisfies the specification.  
(Refer to Fig-1)

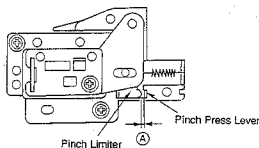
**Adjustment**

2. Loosen the two screws securing the Pinch Solenoid Assembly by 1/4 to 1/2 turn.  
(Refer to Fig-2)
3. Insert a -4 mm flat screw driver tip into the cut-out between the Pinch Press Assembly and chassis. Adjust position of the Pinch Press Assembly to satisfy the specification.
4. After tightening the screws, check the specification again following the above check procedure.

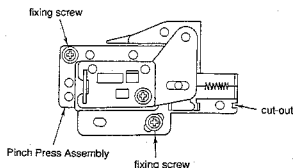


[Fig-1]

Specification :  
① =  $0.7 \pm 0.1$  mm



[Fig-2]

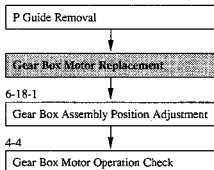


## 6-18. GEAR BOX MOTOR REPLACEMENT

### Tools :

- L shaped wrench (across flat has 1.27 mm)  
: 7-700-736-01  
Thickness gauge : 9-911-053-00

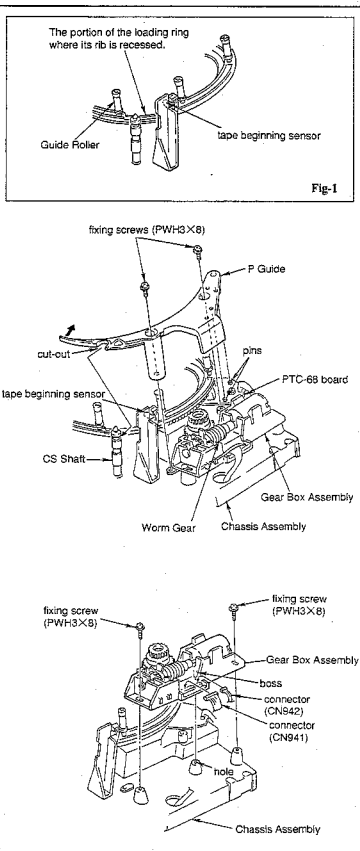
### Replacement flow chart



### Removal

**Precaution :** When removing the P Guide, do not contact with the tape beginning sensor.

1. Rotate the worm of the Gear Box with finger until the Loading Ring arrives at the position shown in the figure. (Refer to Fig-1)
2. Remove the two fixing screws. Remove the P Guide from the CS Shaft by pulling its cut-out in the direction of arrow.
3. Unplug the two connectors (CN941, CN942) connected to the Gear Box Assembly.
4. Remove the two fixing screws securing the Gear Box Assembly. Remove the Gear Box Assembly from the Chassis Assembly.



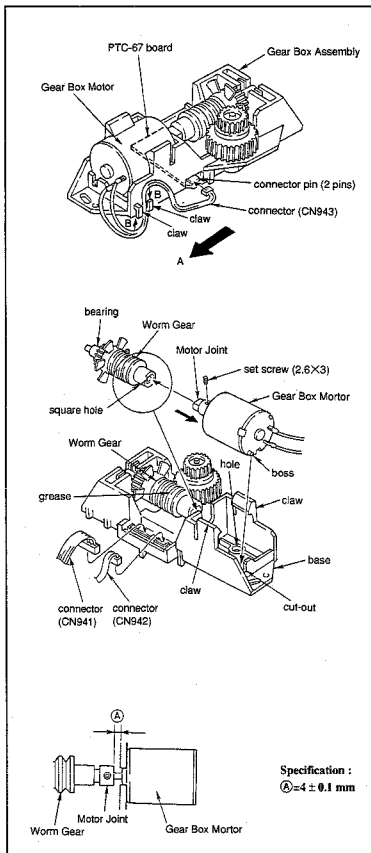
5. Remove the Gear Box Motor harness from the two claws of the Gear Box Assembly.
6. Unplug the Gear Box connector (CN943) from the PTC-67 board.
7. Loosen the set screw securing the motor joint by 1/4 to 1/2 turn. Push the motor joint in the direction of arrow.
8. Pull the Gear Box Motor upward strongly, or push the Gear Box Motor out from the hole of the base. Remove the Gear Box Motor from the Gear Box Block.
9. Extract the motor joint from the Gear Box Motor.

#### Installation

10. Insert the motor joint into the new Gear Box Motor.
11. Align the boss of the Gear Box Motor with the cut-out of the Gear Box Assembly. Push the Gear Box Motor strongly until it is locked with two claws of the Gear Box Assembly.
12. Align the motor joint with the square hole of the worm gear, and slide it. Tighten the set screw at the position where the motor joint position satisfies the specification.
13. Insert the Gear Box Motor connector (CN943) into the PTC-67 board.
14. Remove play of the Gear Box Motor harness in the A direction. Push the harness into the two claws from the direction of arrow B.
15. Align the boss of the Gear Box Assembly with the hole of the Chassis Assembly. Secure them with two fixing screws.
16. Insert the two connectors (CN942, CN941) to the Gear Box Block.

#### Adjustment after replacement

17. Perform the Gear Box Assembly Position Adjustment. (Refer to section 6-18-1)
18. Perform the Gear Box Motor Operation Check. (Refer to section 4-4)
19. Install the P Guide. Secure it with the two fixing screws.



### 6-18-1. Gear Box Assembly Position Adjustment

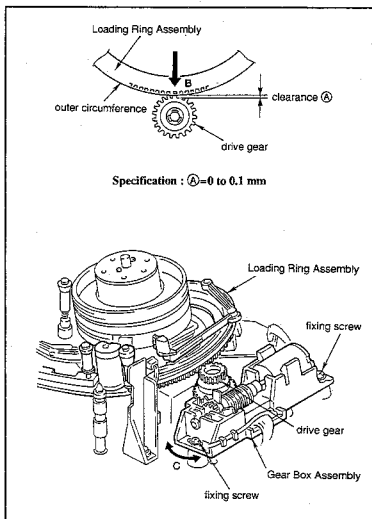
**Mode** : Unthreading end mode

**Tool** : Wire clearance check gauge

J-6152-450-A

#### Adjustment Procedure

1. Loosen the two fixing screws by 1/2 to 1 turn.
2. Pull the Loading Ring Assembly fully in the direction of arrow **B** to remove play.
3. Move the position of the Gear Box Assembly in the direction of arrow **C** until the clearance **(A)** between the outer circumference of the Loading Ring and the bottom end of the Drive Gear tooth satisfies the specification. Tighten the two screws.
4. Check that the clearance **(A)** satisfies the specification.

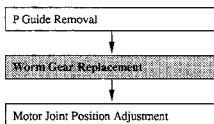


## 6-19. WORM GEAR REPLACEMENT (GEAR BOX)

### Tools :

L shaped wrench (across flat has 1.27 mm)	
Cleaning piece	: 7-700-736-01
Cleaning fluid	: 2-034-697-00
Sony grease (SGL-505)	: 9-919-573-01
Sony oil (NT-68)	: 7-662-010-04
Thickness gauge	: 7-661-018-18
	: 9-911-053-00

### Replacement flow chart

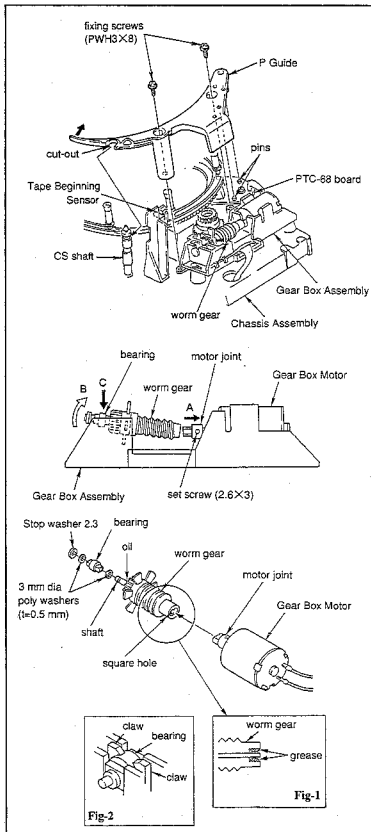


### Removal

1. Remove two fixing screws. Remove the P Guide from the CS shaft by pulling its cut-out in the direction of arrow.
2. Loosen the set screw (2.6×3) by 1/4 to 1/2 turn holding the Motor Joint. Push the Motor Joint in the direction A.
3. Raise the bearing of the Worm Gear in the direction B to remove the Worm Gear.
4. Remove the stop washer 2.3 of the Worm Gear. Remove the two 3 mm dia poly washer (t=0.5 mm) and bearing.

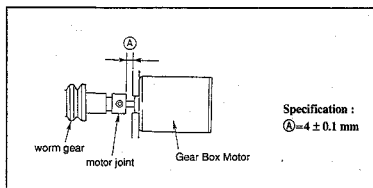
### Installation

5. Clean the shaft of new Worm Gear with cleaning piece moistened with cleaning fluid.
6. Insert two 3 mm dia poly washers and bearing on the Worm Gear shaft, as shown. Secure them with stop washer.
7. Apply a drop of Sony oil between the Worm Gear and bearing. Coat Sony grease thin on the square hole of Worm Gear. (Refer to Fig-1)
8. Push the Worm Gear bearing all the way into the Gear Box Assembly from the direction C until the claw locks. (Refer to Fig-2)



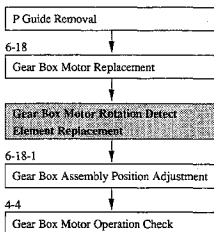
#### Adjustment after replacement

9. Align the Motor Joint with the square hole of the Worm Gear. Tighten the set screw so that the Motor Joint position satisfies the specification.
10. Install the P Guide with fixing screw.



## 6-20. GEAR BOX MOTOR ROTATION DETECT ELEMENT REPLACEMENT

### Replacement flow chart



### Removal

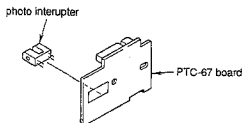
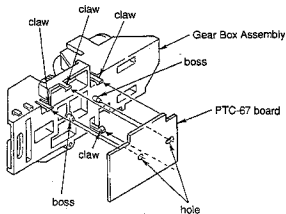
1. Remove the P. Guide referring to the Gear Box Motor Replacement. (Refer to section 6-18.)
2. Remove the Gear Box Assembly referring to the Gear Box Motor Replacement. (Refer to section 6-18.)
3. Remove the PTC-67 board by unlocking the four claws of the Gear Box Assembly.
4. Unsolder the photo interrupter which is soldered to the PTC-67 board.
5. Install a new photo interrupter to the PTC-67 board by soldering.

### Installation

6. Align the PTC-67 board with the two bosses of the Gear Box Assembly as shown. Push it into the four claws.
7. Install the Gear Box Assembly by reversing the procedures of installation. (Refer to section 6-18.)

### Adjustment after replacement

8. Perform the Gear Box Assembly Position Adjustment. (Refer to section 6-18-1.)
9. Perform the Gear Box Motor Operation Check (Refer to section 4-4.)
10. Install the P Guide referring to the Gear Box Motor Replacement. (Refer to section 6-18.)





## 6-21. CAPSTAN MOTOR REPLACEMENT

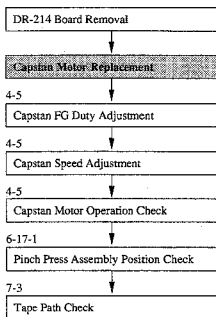
**Mode :** Rotate the worm of the Gear Box with finger to rotate the Loading Ring until the Cleaning Roller is pressed against the Drum.

### Tools :

Cleaning piece : 2-034-697-00

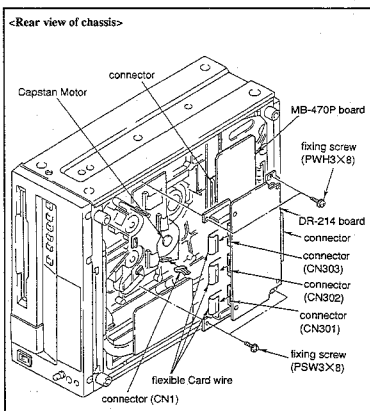
Cleaning fluid : 9-919-573-01

### Replacement flow chart



### Removal

1. Stand the unit with the left side bottom.
2. Remove the four screws holding the DR-214 board.
3. Unplug connectors from DR-214 and MB-470P boards.
4. Remove the three flexible card wire (CN301, CN302, CN303) from the DR-214 board.
5. Unplug the connector (CN1) from the Capstan Motor.



6. While holding the Capstan Motor with finger from the rear of the Chassis, remove the two screws holding the Capstan Motor from the front of the Chassis. Remove the Capstan Motor.

**Precaution 1 :** Hold the Capstan Motor with hand so as not to drop it.

**Precaution 2 :** Pay utmost attention not to injure the Tape Guides around the Capstan Motor.

#### Installation

7. Clean the mounting surface of the new Capstan Motor, and the mounting surface of the Chassis with cleaning piece moistened with cleaning fluid.
8. Insert the Capstan Motor from the rear of the Chassis. Tighten the two fixing screws to install the Capstan Motor.

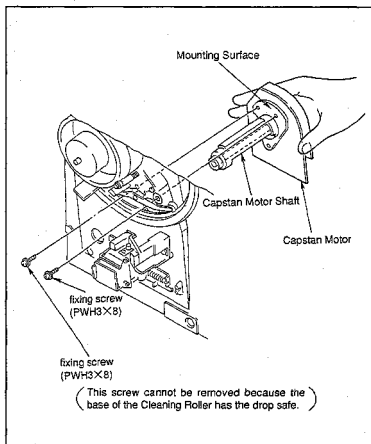
**Precaution 1 :** Pay utmost attention not to injure the Capstan Motor Shaft.

**Precaution 2 :** Pay utmost attention not to injure the Tape Guides around the Capstan Motor.

9. Connect the connector (CN1) to the Capstan Motor.
10. Connect the three flexible card wire (CN301, CN302, CN303) to the DR-214 board.
11. Connect the DR-214 board connector to the MB-470P board.
12. Install the DR-214 board with four fixing screws.

#### Adjustment after replacement

13. Perform the Capstan FG Duty Adjustment.  
(Refer to section 4-5.)
14. Perform the Capstan Speed Adjustment.  
(Refer to section 4-5.)
15. Perform the Capstan Motor Operation Check.  
(Refer to section 4-5.)
16. Perform the Pinch Press Assembly Position Check.  
(Refer to section 6-17-1.)
17. Perform the Tape Path Check.  
(Refer to section 7-3.)



## 6-22. CTL HEAD REPLACEMENT

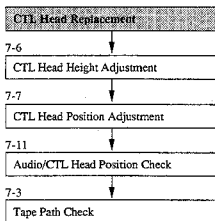
Mode : Unthreading end mode

### Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

### Replacement flow chart

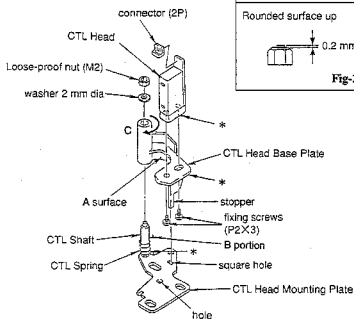
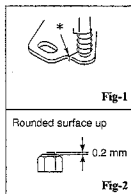
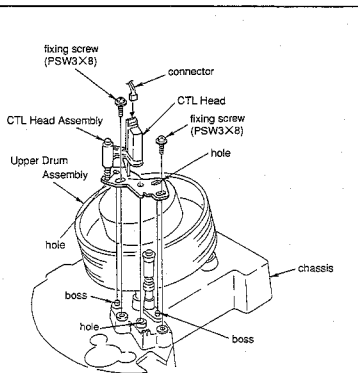


### Removal

1. Rotate the Upper Drum Assembly with finger so that the video head is positioned far from the CTL head.
2. Unplug the connector from the CTL Head

**Precaution :** When removing the CTL Head Assembly, NEVER touch the CTL Head Assembly with the Upper Drum Assembly.

3. Remove the two screws holding the CTL Head Assembly.
4. Remove the loose-proof nut (M2) and washer (2 mm dia) holding the CTL Head Base Plate. Remove the CTL Head Base Plate.
5. Remove the two fixing screws (P2×3) holding the CTL Head from the bottom. Remove the CTL Head from the CTL Head Base Plate.
6. Unsolder the connector (2 pins) of the CTL Head. Remove the CTL Head.



#### **Installation**

7. Connect the connector (2 pins) to a new CTL Head.
8. Clean the mounting surface of the CTL Head and the mounting surface of the CTL Head Base Plate with cleaning piece moistened with cleaning fluid.
9. Install the CTL Head to the CTL Head Base Plate with \* marked positions in parallel each other using two screws. (Refer to Fig-1)
10. Hook the CTL Spring on the \* marked position of the CTL Head Mounting Plate. (Refer to Fig-1)
11. Insert the CTL Head Base Plate into the CTL Shaft of the CTL Head Mounting Plate. Hook the B portion of the CTL Spring on the plane A of the CTL Head Base Plate.
12. While rotating the CTL Head Base Plate in the direction C, insert the stopper of the CTL Head Base Plate into the square hole of the CTL Head Mounting Plate.
13. Install washer to the CTL Shaft as shown, and screw in the loose-proof nut until the CTL Shaft protrudes about 0.2 mm above the rounded surface. (Refer to Fig-2)
14. Align the hole of the CTL Head Mount Plate and that of the chassis. Secure them with two fixing screws.
15. Connect the connector to the CTL Head.

#### **Adjustment after replacement**

16. Perform the CTL Head Height Adjustment.  
(Refer to section 7-6.)
17. Perform the CTL Head Position Adjustment.  
(Refer to section 7-7.)
18. Perform the Audio/Time code Head Position Check. (Refer to section 7-11.)
19. Perform the Tape Path Check.  
(Refer to section 7-3.)

## 6-23. FE HEAD ASSEMBLY/TAPE CLEANER ASSEMBLY REPLACEMENT

### Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

### Replacement flow chart

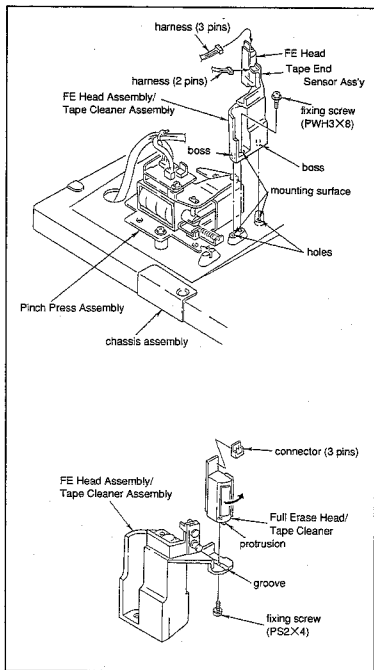
FE Head Assembly/Tape Cleaner  
Assembly Replacement

### Removal

1. Unplug the connectors from the Tape End Sensor Assembly and the Full Erase Head Assembly.  
(Only Tape End Sensor Assembly in UVW-1600P)
2. Remove the screw holding the FE Head Assembly or the Tape Cleaner Assembly. Remove the FE Head Assembly or the Tape Cleaner Assembly from chassis.
3. Remove the screw assembling the FE Head Assembly or the Tape Cleaner Assembly. Remove the FE Head or the Tape Cleaner Assembly from their Assembly.
4. Unsolder the connector (3 pins) from the Full Erase Head. (UVW-1800P only)

### Installation

5. Solder the connector (3 pins) to a new Full Erase Head. (UVW-1800P only)
6. Clean the respective mounting surfaces with cleaning piece moistened with cleaning fluid.
7. Align the protrusion of the Full Erase Head or Tape Cleaner Assembly, with the groove on the mounting surface. Push it in the direction of arrow and assemble them.
8. Align the boss of the FE Head Assembly or Tape Cleaner Assembly, with the holes of the slant chassis. Install it with a screw.
9. Connect the two harnesses to the Full Erase Head and Tape End Sensor Assembly.  
(Only Tape End Sensor Assembly in UVW-1600P)



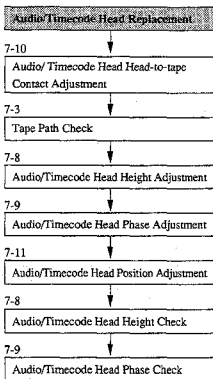
## 6-24. AUDIO/TIMECODE HEAD REPLACEMENT

### Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

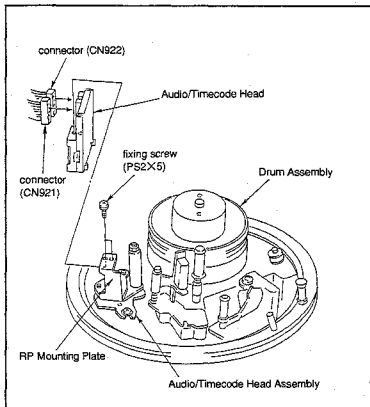
### Replacement flow chart



### Removal

1. Unplug the two connectors (UVW-1800P: CN921, CN922) from the Audio/Timecode Head Assembly (Only CN922 in UYW-1600P).
2. Remove the two screws holding the Audio/ Timecode Head. Remove the Audio/Time code Head Assembly from the RP Mounting Plate.

**Precaution :** When removing the Audio/ Timecode Head, pay utmost attention not injure the tape contacting surface of the Drum Assembly nor respective tape guides.



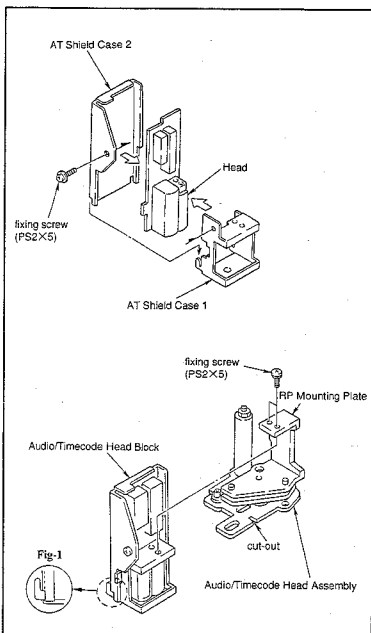
3. Remove the screw assembling the AT Shield Case 1 and AT Shield Case 2. Remove the head.

#### Installation

4. Clean both the mounting surfaces of a new head and RP Mounting Plate with cleaning piece moistened with cleaning fluid.
5. Assemble the head, AT Shield Case 1 and AT Shield Case 2 with a fixing screw. (Refer to Fig-1.)
6. Install the assembled Audio/Timecode head on the RP Mounting Plate of the Audio/Timecode Head Assembly with two screws.

#### Adjustment after replacement

7. Perform the Audio/Timecode Head Head-to-tape Contact Adjustment. (Refer to section 7-10.)
8. Perform the Tape Path Check. (Refer to section 7-3.)
9. Perform the Audio/Timecode Head Height Adjustment. (Refer to section 7-8.)
10. Perform the Audio/Timecode Head Phase Adjustment. (Refer to section 7-9.)
11. Perform the Audio/Timecode Head Position Adjustment. (Refer to section 7-11.)
12. Perform the Audio/Timecode Head Height Check. (Refer to section 7-8.)
13. Perform the Audio/Timecode Head Phase Check. (Refer to section 7-9.)



## 6-25. AT CLEANER REPLACEMENT

Mode : Unthreading end mode

### Replacement flow chart

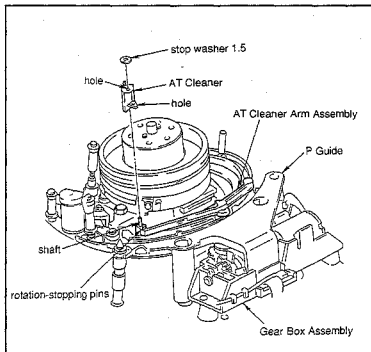
#### AT Cleaner Replacement

#### Removal

1. Remove the stop washer 1.5 holding the AT Cleaner on the AT Cleaner Arm Assembly. Remove the AT Cleaner.

#### Installation

2. Install a new AT Cleaner into the shaft of AT Cleaner Arm Assembly while aligning the respective holes and rotation-stopping pins.
3. Secure the AT Cleaner with a stop washer 1.5.





## 6-26. CLEANING ROLLER REPLACEMENT

Mode : Unthreading end mode

### Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

### Replacement flow chart

#### Cleaning Roller Replacement

#### Removal

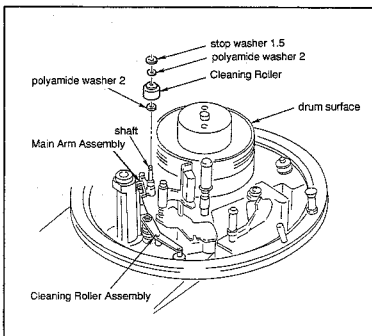
1. Remove the stop washer 1.5 holding the Cleaning Roller using tweezers taking care not to damage the drum surface. Remove the Cleaning Roller from the Cleaning Roller Assembly.

**Precaution :** The polyamide washers are above and below the Cleaning Roller.  
Pay attention not to lose them during replacement.

#### Installation

2. Clean the shaft of a new Cleaning Roller Assembly with cleaning piece moistened with cleaning fluid.
3. Install a new Cleaning Roller into the shaft of Cleaning Roller Assembly in the order as shown. Fix them with a stop washer 1.5.

**Note :** If rotation of Cleaning Roller shows any abnormality, for instance if rotation is not smooth, or any sound comes out during rotation, replace both the Main Arm Assembly and Cleaning Roller at the same time.



## 6-27. REPLACEMENT OF CLEANING DRIVE ARM ROLLER

Mode : Unthreading end mode

### Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

### Replacement flow chart

#### Replacement of Cleaning Drive Arm Roller

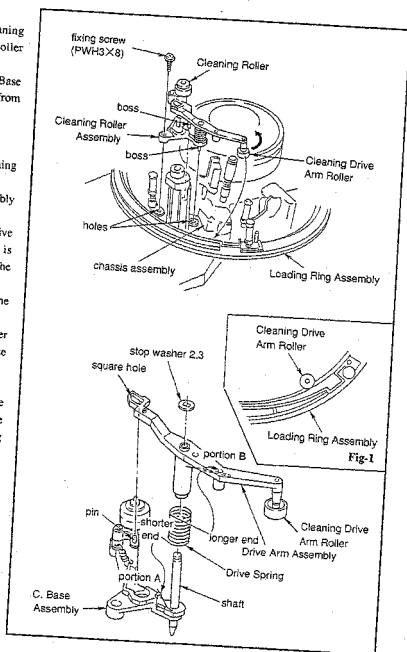
#### Removal

1. Remove the fixing screw holding the Cleaning Roller Assembly. Remove the Cleaning Roller Assembly from chassis.
2. Remove the stop washer 2.3 on top of the C. Base Assembly. Remove the Drive Arm Assembly from the shaft.

#### Installation

3. Clean the shaft of C. Base Assembly with cleaning piece moistened with cleaning fluid.
4. Install the Drive Spring into the C. Base Assembly with the direction as shown.
5. Insert a new Drive Arm Assembly into the Drive Spring and then to the shaft while the pin is inserted in the hole as shown. Secure them with the stop washer 2.3.
6. Hook the shorter end of the Drive Spring on the portion A, and the longer end on the portion B.
7. Align the two protrusions of the Cleaning Roller Assembly with the two holes on the Slant Base Assembly. Secure them with fixing screw.

**Precaution :** When assembling in step 7, the roller of the Drive Arm Assembly must be located at the specified position of the Loading Ring Assembly as shown in Fig-1.



## 6-28. REPLACEMENT OF RING POSITION DETECTOR ELEMENT

Mode : In the middle of threading

### Replacement flow chart

6-18

P. Guide Removal

Replacement of Ring Position Detector Element

4-4

Operation Check of the Ring Position Detector Element

### Removal

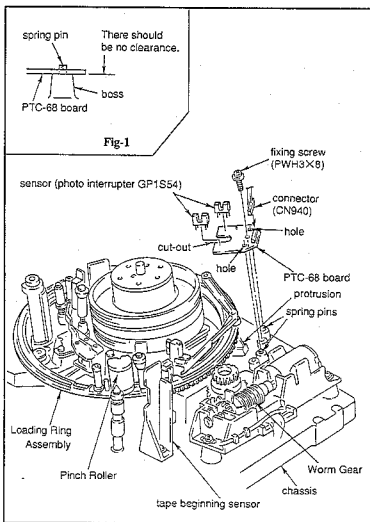
1. Remove the P. Guide. (Refer to section 6-18.)
2. Unplug the connector (CN940) from the PTC-68 board.
3. Rotate the Worm Gear of the Gear Box to rotate the Loading Ring until the Pinch Roller comes in front of the tape beginning sensor.
4. Remove a screw fixing the PTC-68 board. Remove the PTC-68 board from the spring pins (two points).
5. Unsolder and remove the two sensors (photo interrupter GP1S54, 2 pcs) from the board.

### Installation

6. Install and solder the two new sensors on the PTC-68 board.
7. Align the two holes of the PTC-68 board with two spring pins on the chassis. Fix them with a fixing screw.
8. Check for no clearance between PTC-68 board and protrusion. (Refer to Fig-1)

### Adjustment after replacement

9. Perform the operation check of the Ring Position Detector Element. (Refer to section 4-4.)
10. Install the P. Guide. (Refer to section 6-18)



## 6-29. RING ROLLER REPLACEMENT

Mode : In the middle of threading

### Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

### Replacement flow chart

6-18

P. Guide Removal

Disengaging the gears of the Gear Box Assembly

Ring Roller Replacement

6-33-1

Position Adjustment of the Adjustment Ring Roller/Position Adjustment of Gear Box Assembly

### Removal

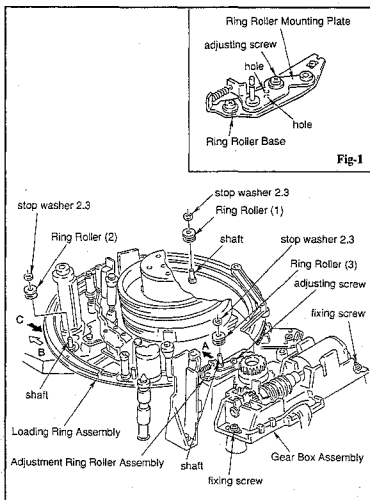
1. Remove the P. Guide. (Refer to section 6-18.)
2. Loosen the two fixing screws securing the Gear Box Assembly which disengages with the Loading Ring Assembly, but snugly tighten them.
3. Loosen the adjusting screw of the Adjustment Ring Roller Assembly. Push the Ring Roller in the direction of arrow A until the hole of the Ring Roller Mounting Plate (Refer to Fig-1) and the hole of the Ring Roller Base agree. Tighten the adjusting screw.
4. Push the Loading Ring in the direction of arrow B, and remove the stop washer 2.3 (three points). Remove the Ring Rollers (1), (2) and (3). (Refer to Fig-1)

### Installation

5. Clean the Ring Roller shaft with cleaning piece moistened with cleaning fluid.
6. Install the new Ring Rollers (3 pcs) in respective shafts. Fix them with stop washers 2.3.
7. Push the Loading Ring Assembly in the direction of arrow C so that it engages with the Ring Rollers (1) and (2).

### Adjustment after replacement

8. Perform the Position Adjustment of the Adjustment Ring Roller and the position Adjustment of the Gear Box Assembly. (Refer to section 6-33-1.)
9. Install the P. Guide. (Refer to section 6-18.)



## 6-30. TAPE THREADING GUIDE REPLACEMENT

Mode : Unthreading end mode

### Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

### Replacement flow chart

#### Tape Threading Guide Replacement

7-3

Tape Path Check

### Removal

1. Remove the loose-proof nut (M2) from the Ring Roller shaft on the Loading Ring Assembly.
2. Remove the upper flange of the Tape Threading Guide.
3. Remove the Tape Threading Guide with spacer (2 × 6.5).

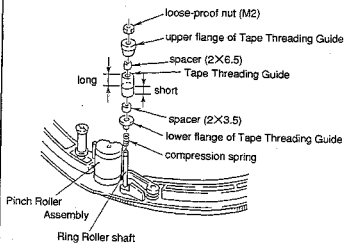
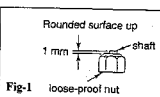
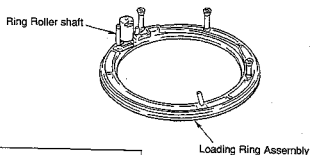
**Precaution :** Spacer (2 × 3.5) inserted underneath can be removed together. Take care not to lose it.

### Installation

4. Clean the outside surface of the Ring Roller shaft on the Loading Ring Assembly with cleaning piece moistened with cleaning fluid.
5. Install a new Tape Threading Guide into the Ring Roller shaft in the direction as shown.
6. Insert the spacer (2 × 6.5) into the Ring Roller shaft.
7. Insert the upper flange of the Tape Threading Guide in the Ring Roller shaft with the smaller diameter tip down.
8. Screw in the loose-proof nut until the shaft protrudes about 1 mm above the rounded surface. (Refer to Fig-1)

### Adjustment after replacement

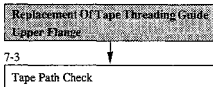
9. Perform the Tape Path Check. (Refer to section 7-3.)



## 6-31. REPLACEMENT OF TAPE THREADING GUIDE UPPER FLANGE

Mode : Unthreading end mode

### Replacement flow chart



### Removal

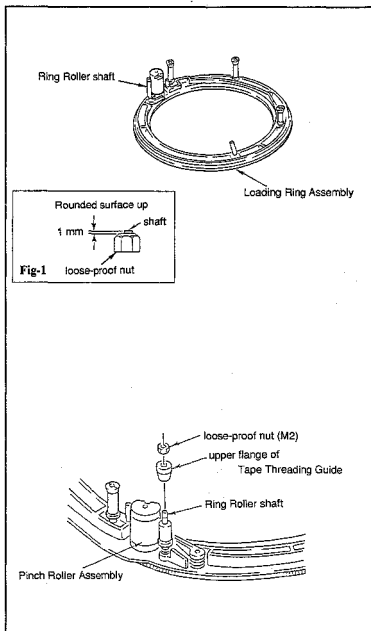
1. Remove the loose-proof nut (M2) from the Ring Roller shaft on the Loading Ring Assembly.
2. Remove the upper flange of the Tape Threading Guide.

### Installation

3. Install a new upper flange of the Tape Threading Guide in the Ring Roller shaft with the smaller diameter tip down.
4. Screw in the loose-proof nut until the shaft protrudes about 1 mm above the rounded surface. (Refer to Fig-1)

### Adjustment after replacement

5. Perform the Tape Path Check. (Refer to section 7-3.)



## 6-32. GUIDE ROLLER ASSEMBLY REPLACEMENT

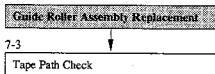
Mode : In the middle of threading

### Tools :

Thickness gauge : 9-911-053-00

Flat head 4 mm screw driver: 7-700-750-03

### Replacement flow chart



### Removal

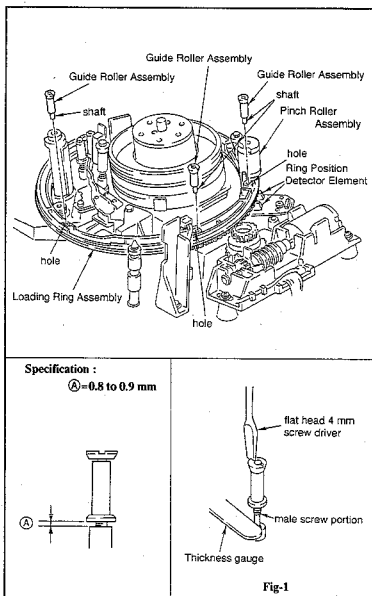
1. Rotate the Loading Ring Assembly until the Pinch Roller Assembly comes in front of the Ring Position Detector Element.
2. Unscrew the Guide Roller Assemblies (3 pcs) from the Loading Ring Assembly until they become loose. Remove them.

### Installation

3. Install the shaft of the new Guide Roller Assemblies into the corresponding holes of the Loading Ring Assembly. (Refer to Fig.1)
4. Screw in the Guide Roller shafts until they satisfy the specification ㊶.

### Adjustment after replacement

5. Perform the Tape Path Check.  
(Refer to section 7-3.)



### 6-33. LOADING RING ASSEMBLY REPLACEMENT

**Mode :** In the middle of threading

**Tools :**

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

**Replacement flow chart**

6-26

Cleaning Roller Assembly Removal

6-23

FE Head Assembly/ Tape Cleaner  
Assembly Removal

6-18

P. Guide Removal

**Loading Ring Assembly Replacement**

6-33-1

Position Adjustment of Adjustment Ring Roller/  
Position Adjustment of Gear Box Assembly

6-17-1

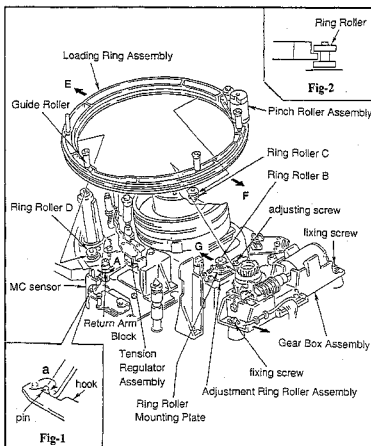
Pinch Press Assembly Position Adjustment

7-3

Tape Path Check

**Removal**

1. Remove the Cleaning Roller Assembly.  
(Refer to section 6-27.)
2. Remove the FE Head Assembly/Tape Cleaner  
Assembly. (Refer to section 6-23.)
3. Remove the P. Guide. (Refer to section 6-18.)
4. Loosen the two fixing screws of the Gear Box  
Assembly to disengage the gear from the Loading  
Ring. When disengaged, snugly tighten the two  
fixing screws.
5. Rotate the Loading Ring with finger until the  
Guide Roller on the Loading Ring comes in front  
of the MC sensor.
6. Rotate the Return Arm of the Tension Regulator  
Assembly in the direction A and lock the pin of the  
Return Arm on the hook a. (Refer to Fig-1.)
7. Loosen the adjusting screw of the Adjustment  
Ring Roller Assembly. Push the Ring Roller  
Mounting Plate in the direction G and snugly  
tighten the adjusting screw.
8. While pushing the Loading Ring Assembly in the  
direction of arrow E, remove the Loading Ring  
Assembly from the Ring Rollers C and D.



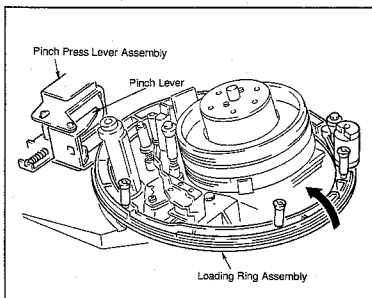


9. Slant the Loading Ring Assembly in the arrow direction as shown in order to escape the mechanism of the Pinch Press Lever, and remove the Loading Ring Assembly.

**Precaution :** Pay utmost attention not to injure the Drum Assembly, Head, Capstan shaft, Tape Guide shafts, etc.

#### Installation

10. Clean the three Ring Rollers with cleaning piece moistened with cleaning fluid.
11. Slant a new Loading Ring Assembly as shown, insert it under the Pinch Lever and install it.
12. Install the Loading Ring Assembly in the direction as shown into the Ring Rollers C and D.
13. While pushing the Loading Ring Assembly in the direction F, loosen the adjusting screw, and engage the Ring Roller with the Loading Ring Assembly. Tighten the adjusting screw with no play. (Refer to Fig-2.)
14. Rotate the Loading Ring Assembly in the clockwise direction with finger until it comes to the unthread end position.



#### Adjustment after replacement

15. Perform the Position Adjustment of the Adjustment Ring Roller, and Position Adjustment of the Gear Box Assembly. (Refer to section 6-33-1.)
16. Perform the P. Guide Installation. (Refer to section 6-18.)
17. Perform the FE Head Assembly/Tape Cleaner Assembly Installation. (Refer to section 6-23.)
18. Perform the Pinch Press Position Adjustment. (Refer to section 6-17-1.)
19. Perform the Tape Path Check. (Refer to section 7-3.)

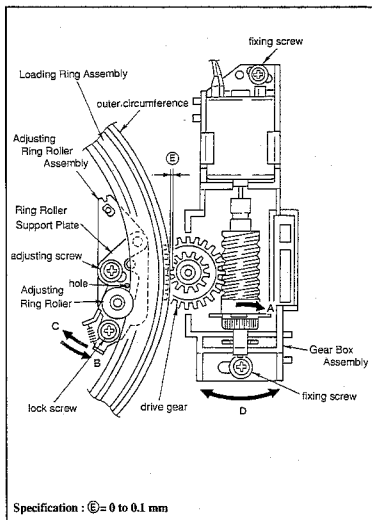
### 6-33-1. Position Adjustment of the Adjusting Ring Roller/Position Adjustment of the Gear Box Assembly

#### Tool :

Wire clearance check gauge: J-6152-450-A

#### Adjustment procedure

1. Rotate the worm gear of the Gear Box Assembly by one to two turns in the direction of Arrow A from the unthreaded end position.
2. Loosen the two fixing screws of the Gear Box Assembly to disengage the gear from the Loading Ring Assembly. Slightly tighten the screws.
3. Loosen the adjusting screw of the Ring Roller Support Plate by 1/4 to 1/2 turn.
4. Loosen the lock screw of the Adjusting Ring Roller Assembly. Push it fully in the direction of Arrow B and tighten the screw.
5. Push the Adjusting Ring Roller fully to the Loading Ring Assembly and tighten the adjusting screw.
6. Move the Gear Box Assembly in the direction D until the clearance ⑤ between the tooth bottom of the Drive Gear on the Gear Box Assembly and outer circumference of Loading Ring Assembly satisfies the specification. When satisfied, tighten the screws.
7. Loosen the lock screw of the Adjusting Ring Roller Assembly. Push the Adjusting Ring Roller fully in the direction of arrow C and tighten the fixing screw.
8. Move the Loading Ring Assembly with finger and check that there is play.



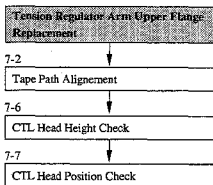
## 6-34. TENSION REGULATOR ARM UPPER FLANGE REPLACEMENT

Mode : Unthreading end mode

### Tool :

L shaped wrench (acroww flat has 0.89 mm) : 7-700-736-06

### Replacement flow chart



### Removal

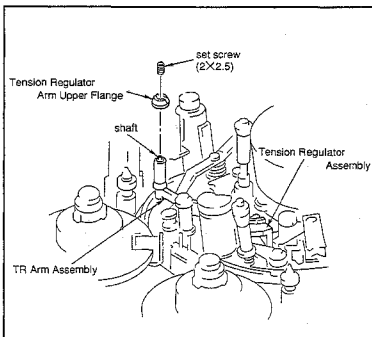
1. Loosen the set screw fixing the Tension Regulator Arm Upper Flange, and remove it.
2. Loosen the Tension Regulator Arm Upper Flange, and remove it.

### Installation

3. Screw in the new Tension Regulator Arm Upper Flange into the shaft of the Tension Regulator Arm Assembly by 4 to 5 turns.
4. Install the set screw on the Tension Regulator Arm Upper Flange.

### Adjustment after replacement

5. Perform the Tape Path Alignment.  
(Refer to section 7-2.)
6. Perform the CTL Head Height Check.  
(Refer to section 7-6.)
7. Perform the CTL Head Position Check.  
(Refer to section 7-7.)



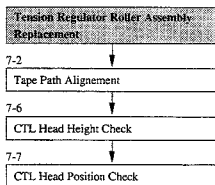
## 6-35. TENSION REGULATOR ROLLER ASSEMBLY REPLACEMENT

Mode : Unthreading end mode

### Tools :

L shaped wrench (across flat has 0.89 mm) : 7-700-736-06

### Replacement flow chart



### Removal

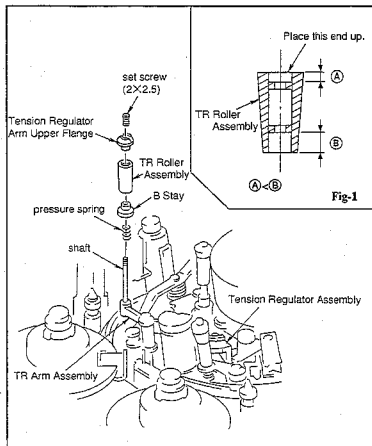
1. Loosen the set screw from the TR Arm Assembly.
2. Loosen the Tension Regulator Arm Upper Flange, and remove the TR Roller Assembly.

### Installation

3. Install the pressure spring and B Stay to the shaft of the TR Arm Assembly.
4. Install a new TR Roller Assembly in the TR Arm Assembly shaft in the direction shown in Fig-1.
5. Screw in the Tension Regulator Upper Flange into the TR Arm Assembly shaft 4 to 5 turns.
6. Install the set screw into the Tension Regulator Upper Flange.

### Adjustment after replacement

7. Perform the Tape Path Alignment.  
(Refer to section 7-2.)
8. Perform the CTL Head Height Check.  
(Refer to section 7-6.)
9. Perform the CTL Head Position Check.  
(Refer to section 7-7.)



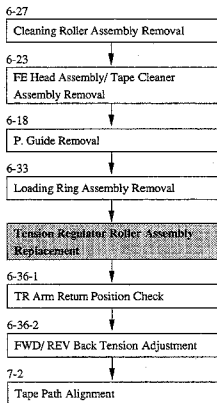
## 6-36. TENSION REGULATOR ASSEMBLY REPLACEMENT

Mode : Unthreading end mode

### Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Cassette Reference Plate (L)	: J-6320-880-A
Thickness gauge	: J-6041-670-A

### Replacement flow chart



### Removal

1. Remove the Cleaning Roller Assembly.  
(Refer to section 6-27.)
2. Remove the FE Head Assembly/ Tape Cleaner Assembly. (Refer to section 6-23.)
3. Remove the P. Guide. (Refer to section 6-18.)
4. Remove the Loading Ring Assembly.  
(Refer to section 6-33.)

**Precaution :** Rotate the Upper Drum with finger and stop at the position where video head will not contact the parts to remove.

5. Unplug the connector from TR-84 board.
6. Remove the two fixing screws of Tension Regulator Assembly and remove the it from chassis assembly.

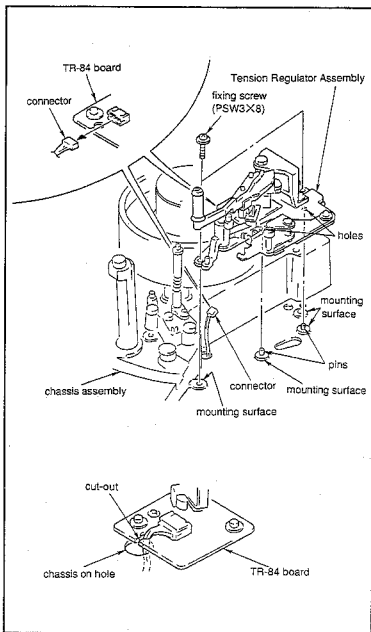
**Precaution :** Pay utmost attention not to injure tape contacting surface of the Upper Drum or guides etc.

### Installation

7. Clean the mounting surface of new Tension Regulator Assembly and chassis Assembly with Cleaning piece moistened with cleaning fluid.
8. Align the two holes of Tension Regulator Assembly with the two pins of the chassis Assembly. Assemble with two fixing screws.
9. Insert the connector to TR-84 board. Place the harness on the cut-out of TR-84 board. Remove slack of harness.
10. Install the new Tension Regulator Assembly by reversing the steps from 4 through 1.

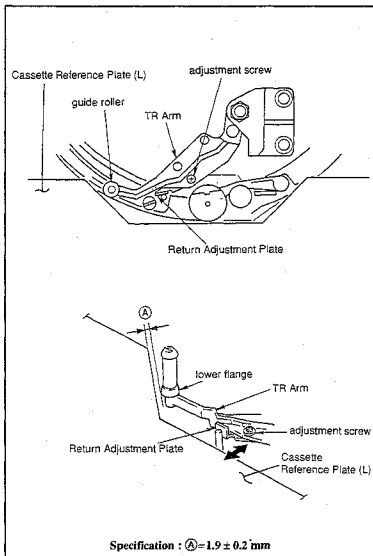
### Adjustment after replacement

11. Perform the TR Arm Return Position Check  
(Refer to section 6-36-1.)
12. Perform the FWD/REV Back Tension Adjustment  
(Refer to section 6-36-2.)
13. Perform the Tape Path Alignment  
(Refer to section 7-2.)



#### 6-36-1. TR Arm Return Position Adjustment

1. Turn on the power. Press STOP button to go through threading. Press EJECT button to go through unthreading and put the mechanism in the unthread end mode.
2. Place the Cassette Reference Plate.
3. Check that the clearance between the Cassette Reference Plate and the outer circumference of the TR Arm Guide Roller, satisfies the specification.
4. If the specification is not satisfied, loosen the adjustment screw, move the Return Adjustment Plate in the direction of arrow as shown until the specification is satisfied. Tighten the adjusting screw.



## 6-36-2. FWD/REV Back Tension Adjustment

Mode : PLAY mode

### Tool :

Tension measurement tool (Tentelometer T2-H7 SLC)

### Preparation :

Connect a video monitor to the VIDEO OUTPUT 2 connector to display the characters.

1. Install the Cassette Up Compartment.
2. Display the "MAINTENANCE MENU" on the monitor screen. (Refer to section 4.)
3. Select "SERVO ADJUST" from the menu by Up/Down key.
4. Press the right key to display the following screen.
5. Select "TENSION" from the servo adjustment menu by Up/Down key.
6. Press the right key to display the following screen.

7. Select "TENSION" from the servo adjustment menu by Up/Down key.
8. Press the right key to display the following screen.

9. When preparation is ready, press YES key to start the adjustment.

```
MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS
```

```
MAINTENANCE MENU
SERVO ADJUST
S/T-PEEL & CAPSTAN
S-PEEL ONLY
T-REEL ONLY
CAPSTAN ONLY
TENSION
RF SWITCHING POSITION
PICTURE SPLITTING
SAVE/LOAD CONTROL
```

```
MAINTENANCE MENU
SERVO ADJUST
TENSION
MAGNET & HOOK POS.
HOOK POS.
TENSION
```

```
SERVO ADJUST MODE

START OK ?

NO KEY : RETURN TO MENU
YES KEY : ADJUST START
```



#### Adjustment after replacement

10. Thread a tape and press stop button.

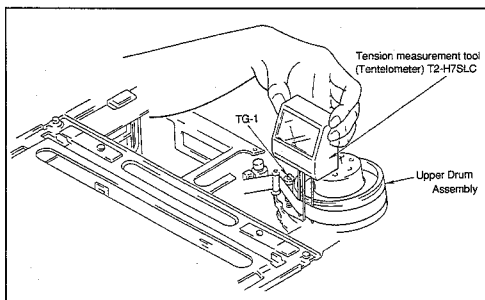
SERVO ADJUST MODE  
PERFORM ADJUSTMENTS  
REFERRING TO SERVICE  
MANUAL (6-36).  
  
SET CASSETTE  
AND PUSH STOP KEY.  
  
CANCEL : MENU KEY

11. Hold the Tentelometer (tension measurement tool) with hand resting on the Cassette Up Compartment as shown. Insert it between the TG-1 and Upper Drum as shown.

SERVO ADJUST MODE  
  
SET THE TENTELO METER.  
  
NEXT : (+) KEY  
CANCEL : MENU KEY

**Precaution :** If the tension measurement tool happens to contact with the Upper Drum Assembly, it may give permanent damage to head tip and drum which will be unusable any more. Pay utmost attention not to contact.

12. Press the right key to display the following screen.  
(Machine enters PLAY mode automatically)



13. Keep pressing the Up/Down key until pointer of the tension measurement tool indicates  $45 \pm 3$  g.

14. When the adjustment is complete, press the right key.

15. Keep pressing the Up/Down key until pointer of the tension measurement tool indicates  $25 \pm 3$  g.

16. When the adjustment is complete, press the right key.

17. Confirm that pointer of the tension measurement tool indicates  $45 \pm 5$  g.

18. Press the right key to display the following screen.  
(Machine enters REV mode automatically.)

19. Keep pressing the Up/Down key so that the REV back tension becomes  $30 \pm 3$  g.

20. Press the right key to display the following screen.

SERVO ADJUST MODE

ADJUST TENSION  
WITH (↑) OR (↓) KEY  
IN RANGE OF  $45 \pm 3$ g.

NEXT : (→) KEY  
CANCEL : MENU KEY

SERVO ADJUST MODE

ADJUST TENSION  
WITH (↑) OR (↓) KEY  
IN RANGE OF  $25 \pm 3$ g.

NEXT : (→) KEY  
CANCEL : MENU KEY

SERVO ADJUST MODE

CHECK TENSION  
IN RANGE OF  $45 \pm 5$ g.

NEXT : (→) KEY  
CANCEL : MENU KEY

SERVO ADJUST MODE

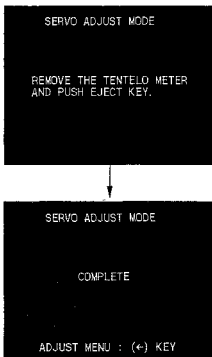
ADJUST TENSION  
WITH (↑) OR (↓) KEY  
IN RANGE OF  $30 \pm 3$ g.

NEXT : (→) KEY  
CANCEL : MENU KEY

21. Remove the tension measurement tool paying utmost care not to contact with the drum.

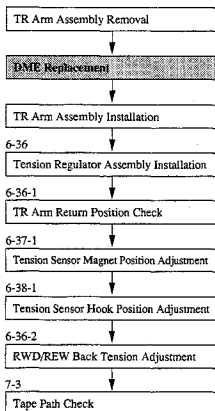
22. Press the EJECT button to eject the cassette tape.

23. Confirm that "COMPLETE" is displayed on monitor screen.



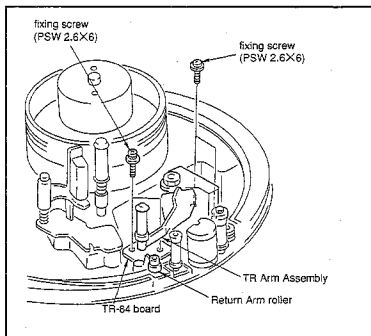
## 6-37. TENSION SENSOR AND DME REPLACEMENT

### Replacement flow chart



### Removal


1. Rotate the worm of the Gear Box with finger until roller of the Return Arm comes to the position shown in the figure.
2. Remove the two screws holding the TR Arm Assembly. Remove the TR Arm Assembly.



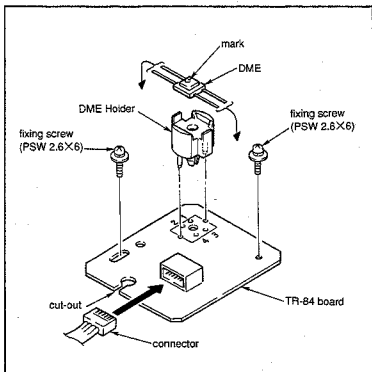
3. Unplug the connector from the TR-84 board.
4. Remove the two screws holding the TR-84 board. Remove the TR-84 board.
5. Unsolder the DME, and remove the DME and DME Holder from the TR-84 board.

#### Installation

6. Install a new DME into the DME Holder tightly without play. Bend legs of the DME.

**Note :** Align the  marked leg of the DME with the pin No.1 of TR-84 board.

7. Secure the new DME Holder into the TR-84 board tightly. Connect them by soldering.
8. Install the TR-84 board with two fixing screws.
9. Connect the harness to the TR-84 board connector. Place the harness to the cut-out of the TR-84 and remove slack of harness.
10. Install the TR Arm Assembly with two fixing screws.
11. Install the Tension Regulator Assembly with two fixing screws. (Refer to section 6-36.)
12. Perform the TR Arm Return Position Check. (Refer to section 6-36-1.)
13. Perform the Tension Sensor Magnet Position Adjustment. (Refer to section 6-37-1.)
14. Perform the Tension Sensor Hook Position Adjustment. (Refer to section 6-38-1.)
15. Perform the RWD/REV Back Tension Adjustment. (Refer to section 6-36-2.)
16. Perform the Tape Path Check. (Refer to section 7-3.)



### 6-37-1. Tension Sensor Magnet Position Adjustment

Mode : Threading end mode

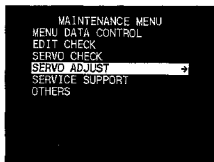
#### Tools :

- TR Arm Position Adjustment Tool Parallelism pin 3×12 : 3-703-360-09
- Eccentric screw driver : 3-702-390-02
- or
- Flat head 3 mm screw driver : 7-700-750-01

#### Preparation :

Connect a video monitor to the VIDEO OUTPUT 2 connector to display the characters.

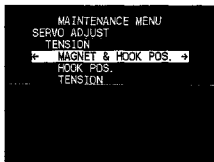
1. Remove the Cassette Up Compartment.
2. After power is turned ON, press the eject key.
3. Display the "MAINTENANCE MENU" on the monitor screen. (Refer to section 4.)
4. Select "SERVO ADJUST" from the menu by Up/Down key.
5. Press the right key to display the following screen.



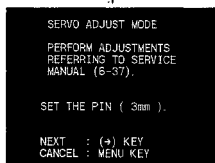
6. Select "TENSION" from the servo adjustment menu by Up/Down key
7. Press the right key to display the following screen.



8. Select "MAGNET & HOOK POS." from the Tension Servo Adjustment menu by Up/Down key.
9. Press the right key to display the following screen.

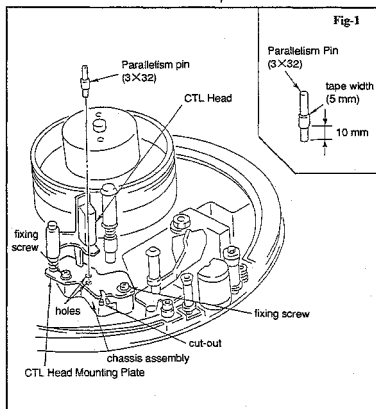


10. When preparation is ready, press YES key to start the adjustment.



#### Adjustment after replacement

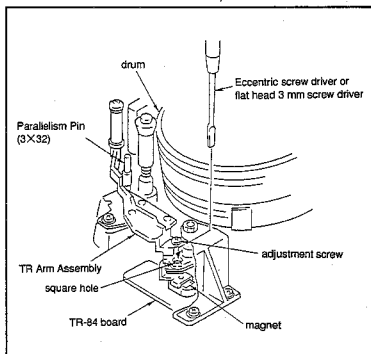
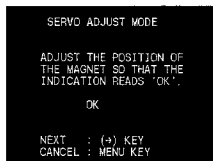
11. Wrap a 5 mm width vinyl tape 1 to 2 turns around the Parallelism Pin at the position of 10 mm from its end. (Refer to Fig-1)
12. Loosen the two fixing screws 1/2 to 1 turn holding the CTL Head Assembly.
13. Insert a flat (head) screw driver tip into the cut-out of the CTL Head Mounting Plate. Adjust the position so that the hole of the CTL Head Mounting Plate and the hole of the chassis are aligned.
14. Insert Parallelism Pin setting the TR Arm Position passing through the hole of the CTL Head Mounting Plate and the hole of the chassis.



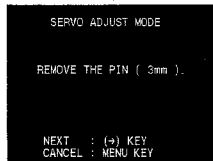
15. Press the right key to display the following screen.
16. Loosen the adjustment screw of the TR Arm Assembly.
17. Insert a flat (head) screw driver tip into the square hole of the TR Arm Assembly. Adjust the position by rotating the magnet so that the HIGH/LOW is changed to "OK" on the monitor display.

**Note 1 :** Magnet position is very delicate. Adjust with enough attention.

**Note 2 :** Pay utmost attention not to contact the tools with drum.



18. Press the right key to display the following screen.
19. Remove the Parallelism Pin.
20. Press the right key to display the following screen.
21. Perform the Tension Sensor Hook Position Adjustment. (Refer to 6-38-1.)



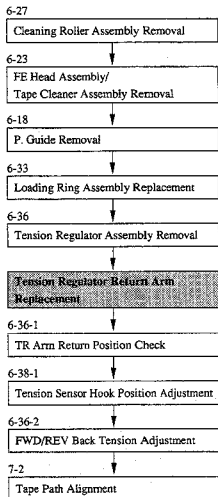


## 6-38. TENSION REGULATOR RETURN ARM REPLACEMENT

### Tools :

Cleaning piece : 2-034-697-00  
Cleaning fluid : 9-919-573-01  
Sony grease (SGL-505) : 7-662-010-04

### Replacement flow chart



## Removal

1. Remove the Cleaning Roller Assembly.  
(Refer to section 6-27.)
2. Remove the FE Head Assembly/Tape Cleaner Assembly.  
(Refer to section 6-23.)
3. Remove the P. Guide.  
(Refer to section 6-18.)
4. Remove the Loading Ring Assembly.  
(Refer to section 6-33.)
5. Remove the Tension Regulator Assembly.  
(Refer to section 6-36.)
6. Remove the tension coil spring hooked on the Return Arm.
7. Remove the two fixing screws from the TR Arm Assembly. Remove the leaf spring and protector together.
8. Remove the E-ring 2.3 from the shaft of Tension Regulator Assembly. Remove the Return Arm.

## Installation

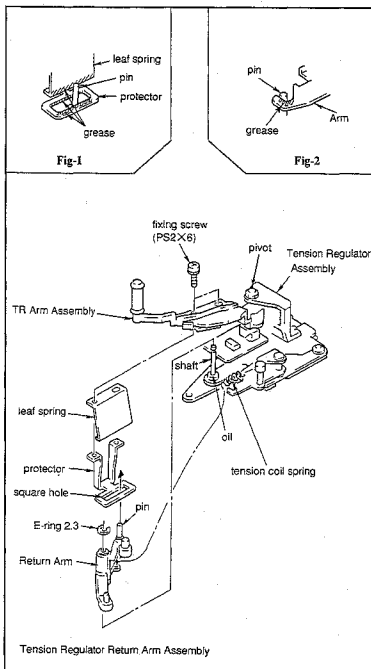
9. Clean the shaft of the Tension Regulator Assembly with cleaning piece moistened with cleaning fluid. Apply a drop oil on the shaft surface.
10. Install a new Return Arm into the shaft and secure it with E-ring 2.3.
11. Assemble the leaf spring and protector as shown. Install them to the TR Arm Assembly while the Return Arm Pin enters the square hole of the protector, as shown. Secure them with two screws.

**Precaution :** When securing them, do not apply force to the pivot of the TR Arm Assembly.

12. Hook the tension coil spring on the Return Arm.
13. Coat grease thin on the protector, leaf spring and Arm.  
(Refer to Fig-1, Fig-2)
14. Install the Tension Regulator Assembly.  
(Refer to section 6-36.)

## Adjustment after replacement

15. Perform the TR Arm Return Position Check.  
(Refer to section 6-36-1.)
16. Perform the Tension Sensor Hook Position Adjustment.  
(Refer to section 6-38-1.)
17. Perform the FWD/REV Back Tension Adjustment.  
(Refer to section 6-36-2.)
18. Perform the Tape Path Alignment.  
(Refer to section 7-2.)



### 6-38-1. Tension Sensor Hook Position Adjustment.

**Mode :** Threading end mode

**Tool :** Tension Sensor Adjustment Tape Tool  
(Refer to section 6-1.)  
(Hook Position Adjustment Tape Tool)

#### Preparation :

Connect a video monitor to the VIDEO OUTPUT 2 connector to display the characters.

#### Replacement flow chart

1. Remove the Cassette Up Compartment.
2. After power is turned ON, press the eject key.
3. Display the "MAINTENANCE MENU" on the monitor screen. (Refer to section 4.)
4. Select "SERVO ADJUST" from the menu by Up/Down key.
5. Press the right key to display the following screen.
6. Select "TENSION" from the servo adjustment menu by Up/Down key
7. Press the right key to display the following screen.
8. Select "HOOK POS." from the Tension Servo Adjustment menu by Up/Down key.
9. Press the right key to display the following screen.
10. When preparation is ready, press YES key to start the adjustment.

```
MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS
```

```
MAINTENANCE MENU
SERVO ADJUST
S/T-REEL & CAPSTAN
S-REEL ONLY
T-REEL ONLY
CAPSTAN ONLY
TENSION
RF SWITCHING POSITION
PICTURE SPLITTING
SAVE/LOAD CONTROL
```

```
MAINTENANCE MENU
SERVO ADJUST
TENSION
MAGNET & HOOK POS.
HOOK POS.
TENSION
```

```
SERVO ADJUST MODE

START OK ?

NO KEY : RETURN TO MENU
YES KEY : ADJUST START
```

SERVO ADJUST MODE

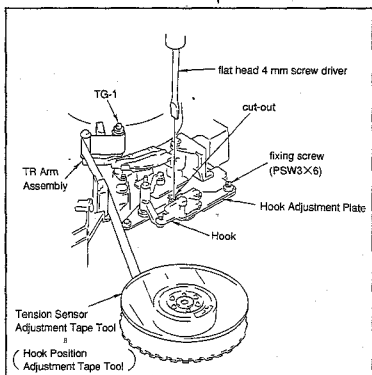
PERFORM ADJUSTMENTS  
REFERRING TO SERVICE  
MANUAL (6-38).

FIT THE HOOK-POSITION-  
ADJUSTMENT-TAPE INTO  
S-REEL AND TG-1.

NEXT : (+) KEY  
CANCEL : MENU KEY

Adjustment after replacement

11. Place the Tension Sensor Adjustment Tape Tool on the supply reel as shown. Hook its top loop on TG-1.  
Thread the tape in the normal tape path as shown.



12. Press the right key to display the following screen.
13. Loosen slightly the fixing screw of the Hook Adjustment Plate.
14. Insert a flat head screw driver tip into the cut-out of the Hook Adjustment Plate so that the HIGH/LOW is changed to "OK" on the monitor display.
15. Press the right button to display the following screen.

SERVO ADJUST MODE

ADJUST THE POSITION OF  
THE HOOK SO THAT THE  
INDICATION READS "OK".

OK

NEXT : (+) KEY  
CANCEL : MENU KEY

16. Remove the Tension Sensor Adjustment Tape Tool.
17. Press the EJECT button.
18. Set the switches on SS-53 board S201-1 and -4 to off. (Refer to section 6-1.)

SERVO ADJUST MODE

REMOVE THE HOOK-POSITION  
-ADJUSTMENT-TAPE AND  
PUSH EJECT KEY.

## SECTION 7 TAPE PATH ALIGNMENT

### 7-1. GENERAL INFORMATION FOR TAPE PATH ADJUSTMENT

#### 1. ALIGNMENT TAPE

The following alignment tapes are used in the tape path adjustment

CR2-1B PS : 8-960-096-51

CR5-1B PS : 8-960-096-91

CR8-1B PS : 8-960-096-86

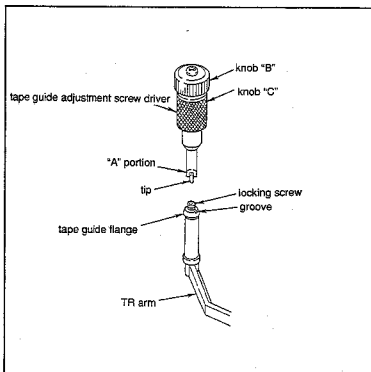
#### 2. TAPE GUIDE ADJUSTMENT SCREW DRIVER

: J-6321-500-A

This tape guide adjustment screw driver is used to rotate the upper flange of the TR arm guide roller during tape path (entrance side) alignment. Operating procedure of this tape guide adjustment screw driver is described below.

- (1) Align the "A" portion with the groove of tape guide.
- (2) Hold the knob "C" and rotate the knob "B" which loosens the locking screw.
- (3) Align the knob "B" tip with the hole of the tape guide locking screw.  
Hold the knob "B" and rotate the knob "C" which rotates the upper flange of the tape guide.
- (4) To tighten the locking screw of the tape guide flange, hold the knob "C" and rotate the knob "B" which tightens the locking screw.

Tightening torque : 0.1 to 0.12 N · m  
(1.0 to 1.2 kgf · cm)



#### 3. OTHER TAPE GUIDE ADJUSTMENT SCREW DRIVER

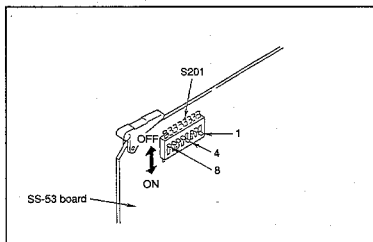
Use the box driver with 4.5 mm diagonal size

#### 4. USE OF CASSETTE COMPARTMENT

Attach the cassette compartment during the tape path alignment. It enables more accurate adjustments.

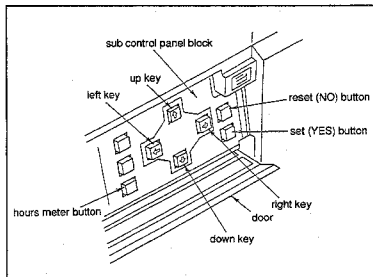
#### 5. USE OF VIDEO TRACKING CONTROL

- (1) The Video Tracking Control potentiometer is not equipped in this unit. The video tracking can be changed by setting the SS-53 board switch S201-1 to on and pressing the Left key or Right key on the Sub Control Panel.  
(The S201 switches are all set to off when shipped from factory.)
- (2) When the RESET (NO) button is pressed, the video tracking is reset to the tracking center position.  
When the power is turned off, the video tracking is reset to the tracking center position.



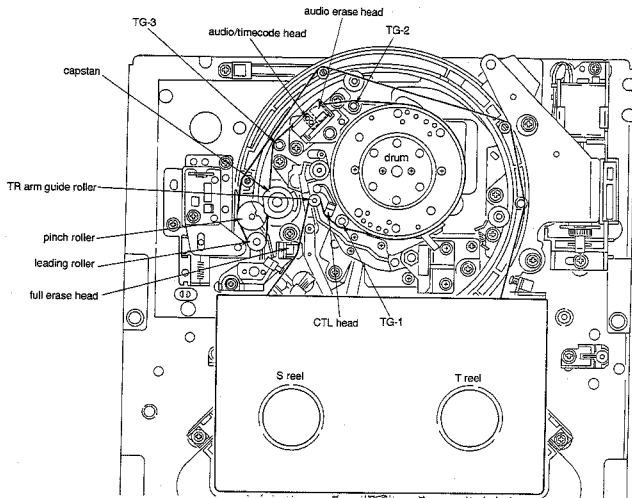
#### 6. TAPE PATH ALIGNMENT PREPARATION

- (1) Set the SS-53 board switch S201-1 to on.
- (2) Clean the tape contacting surface of tape guides, drum, video head, etc., with cleaning piece soaked with cleaning fluid.
- (3) REV mode cannot be established with this unit alone. Use a remote control unit (SVRM-100) or controller (RM-450 and others) to establish REV mode.

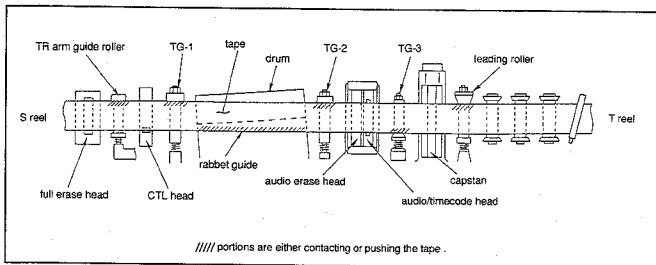


## 7. LOCATION OF HEADS AND TAPE GUIDES

Location of heads and tape guides referred to in the alignment procedure is shown below.



## 8. TAPE PATH DIAGRAM





# 9. LIST OF MEASUREMENT POINTS/SIGNALS FOR ADJUSTMENT

SIGNAL NAME	BOARD NAME	TP TERMINAL (ADDRESS)	MARKING ON BOARD
VIDEO RF Y-Ach	VP-43P/ VP-43AP	TP101 (L-2)	YA
VIDEO RF Ych	VP-43P/ VP-43AP	TP103 (L-1)	Y RF
VIDEO RF C ch	VP-43P/ VP-43AP	TP301 (H-1)	C RF
SWICHING PULSE Ych	VP-43P/ VP-43AP	TP102 (P-1)	Y SW
GND	VP-43P/ VP-43AP	E102 (N-1)	GND
CTL SIGNAL	SS-53	TP225 (C-1)	CTL SIG
CTL PULSE	SS-53	TP203 (D-1)	CTL PULSE
GND	SS-53	E201 (D-1)	GND
AUDIO OUT	CH-1	AP-31P/AP-31AP	TP5 (G-1)
GND	AP-31P/AP-31AP	E2 (G-1)	GND
AUDIO OUT	CH-2	AP-31P/AP-31AP	TP205 (D-1)
GND	AP-31P/AP-31AP	E202 (E-1)	GND
TIME CODE	AP-31P/AP-31AP	TP403 (D-1)	LTC EQ

## 7-2. TAPE PATH ALIGNMENT

The tape path alignment is very important adjustment to run a tape in the optimum conditions.

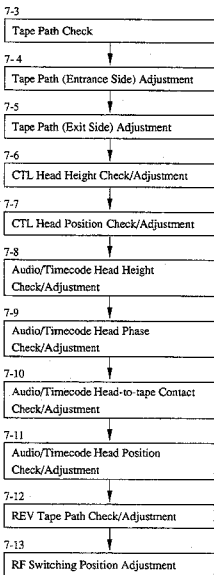
If this alignment is incorrect, tape may be injured.

Pay utmost attention when performing this adjustment.

Attach the cassette compartment when performing the tape path alignment.

It enables more accurate adjustments.

### Adjustment flow chart



**Caution :** When any one of the adjustments is performed, check all the subsequent items in the order of flow chart.

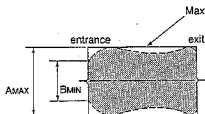
### 7-3. TAPE PATH CHECK

#### Tools :

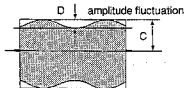
Cleaning piece : 2-034-697-00  
Cleaning fluid : 9-919-573-01  
Alignment tape CR2-1B PS : 8-960-096-51  
Adjustment inspection mirror : J-6080-029-A  
Dual trace oscilloscope

#### Check procedure

1. Connect an oscilloscope.  
CH-1 : TP101/VP-43P, VP-43AP board (L-2)  
CH-2 : TP102/VP-43P, VP-43AP board (P-1)  
TRIG : CH-2
2. Playback the alignment tape CR2-1B PS.
3. Press the Left or Right key on the sub control panel for the maximum RF envelope.
4. This envelope must satisfy the specifications of BMIN versus AMAX amplitude ratio.
5. Amplitude fluctuation of this RF envelope must satisfy the specifications at entrance, center and exit.



$$\text{Specification : } \frac{B}{A} \geq 80 \%$$

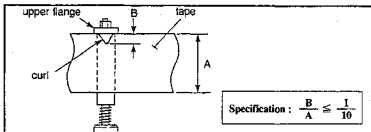


$$\text{Specification : } D \leq \frac{1}{10} C$$

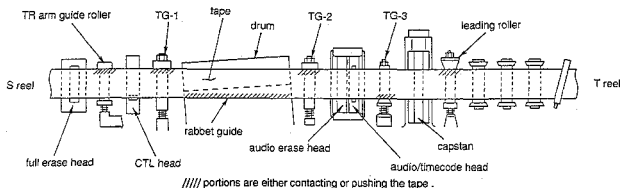
6. The RF envelope must satisfy the specifications of steps 4 and 5, and at the same time must satisfy the tape curl specifications at each guide.

- Tape curl specifications

- (1) Amount of tape curl at the upper flanges of the TR arm guide roller, TG-1, TG-2 and the leading guide must be less than 1/10 of tape width.
- (2) Tape curl must not exist at drum rabbit guide (entrance and exit) and TG-3.



#### Tape path condition



Specification : Any partial loss of tape-to-head contact must not occur.

7. The RF envelope must not have any partial loss of tape-to-head contact in FF and REW modes.



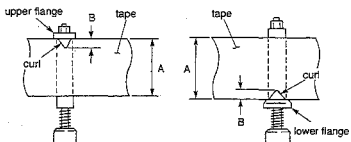
8. Tape path in FF and REW modes must satisfy the following tape path specifications at each guide.

- Tape curl specifications.

- (1) Amount of tape curl at the upper flanges of the TR arm guide roller, TG-1, TG-2 and the leading guide roller must be less than 1/10 of tape width. That at the lower flange of TG-3 must meet this specifications too.
  - (2) Tape curl must not exist at drum rabbit guide (entrance and exit).
9. If the tape path does not satisfy the specifications from steps 4 through 8, perform the section "7-4. Tape Path (Entrance Side) Adjustment" and "7-5. Tape Path (Exit Side) Adjustment".

Specifications of tape curl at the upper flange

Specifications of tape curl at the lower flange



Specification :  $\frac{B}{A} \leq \frac{1}{10}$

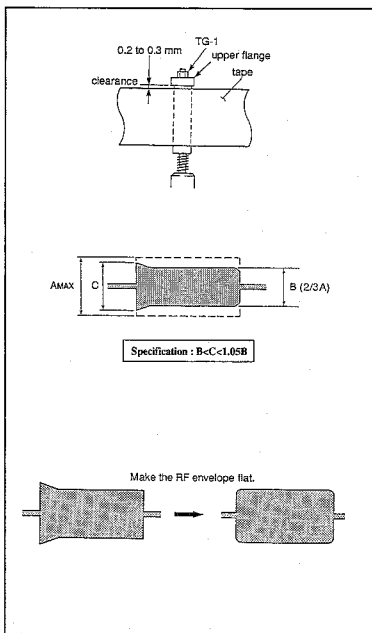
## 7-4. TAPE PATH (ENTRANCE SIDE) ADJUSTMENT

### Tools :

- Cleaning piece : 2-034-697-00
- Cleaning fluid : 9-919-573-01
- Alignment tape CR2-1B PS : 8-960-096-51
- Tape guide adjustment screw driver : J-6321-500-A
- Adjustment inspection mirror : J-6080-029-A
- Dual trace oscilloscope
- Box driver (diagonal length 4.5 mm)

### Adjustment procedure

1. Connect an oscilloscope.  
CH-1 : TP101/VP-43P, VP-43AP board (L-2)  
CH-2 : TP102/VP-43P, VP-43AP board (P-1)  
TRIG : CH-2
2. Playback the alignment tape CR2-1B PS.
3. While running a tape in play mode, loosen the TG-1 nut so that a clearance is generated between TG-1 upper flange and tape.
4. Press the Left key on the sub control panel so that RF signal amplitude is decreased to 2/3.
5. Loosen the screw fixing the TR arm guide roller upper flange. Adjust height of the upper flange until the specifications is satisfied. After adjustment, tighten the fixing screw.
6. Adjust height of TG-1 using the nut until the RF envelope is flat.
7. The tape curl at the upper flanges of the TR arm guide roller and TG-1 must be less than 1/10 of tape width.
8. Establish REV  $\times$  1 tape speed. The tape curl at the upper flanges of the TR arm guide roller and TG-1 must be less than 1/10 of tape width.



## 7-5. TAPE PATH (EXIT SIDE) ADJUSTMENT

### Tools :

- Cleaning piece : 2-034-697-00
- Cleaning fluid : 9-919-573-01
- Alignment tape CR2-1B PS : 8-960-096-51
- Adjustment inspection mirror : J-6080-029-A
- Dual trace oscilloscope
- Box driver (diagonal length 4.5 mm)
- 2 mm screw driver

### Adjustment procedure

1. Connect an oscilloscope.
  - CH-1 : TP101/VP-43P, VP-43AP board (L-2)
  - CH-2 : TP102/VP-43P, VP-43AP board (P-1)
  - TRIG : CH-2
2. Playback the alignment tape CR2-1B.
3. While running the tape in play mode, loosen the TG-3 nut so that a clearance is generated between TG-3 lower flange and tape.
4. Press the Left and Right key on the sub control panel for the maximum RF envelope.
5. Loosen the TG-2 nut so that a clearance is generated between TG-2 upper flange and tape.
6. The RF envelope must satisfy the specifications shown. (Refer to Fig-1.)

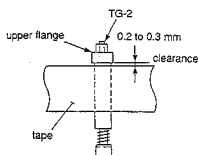
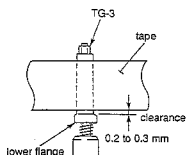
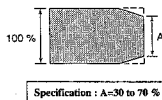
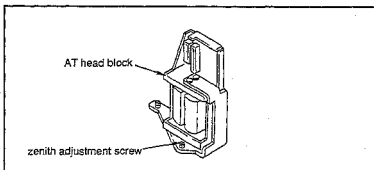


Fig-1.



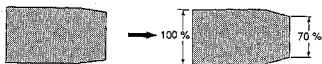
7. If the specifications A in step 6 is not satisfied, adjust the zenith adjustment screw of the AT head.



- (1) If the specifications A is 30 % or low, turn the zenith adjustment screw of the AT head counter-clockwise as shown.

Adjustment when A is 30 % or less.

Turn the zenith adjustment screw counter-clockwise.

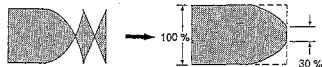


This waveform is called as 30 %.

- (2) If the specifications A is 70 % or more, turn the zenith adjustment screw of the AT head clockwise as shown.

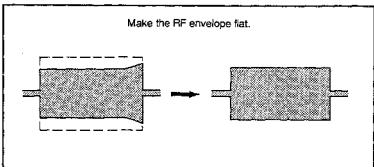
Adjustment when A is 70 % or more.

Turn the zenith adjustment screw clockwise.



This waveform is called as 70 %.

8. (1) While the tape top is contacting with the TG-2 upper flange, adjust the TG-2 nut so that the RF signal amplitude becomes 2/3 of the maximum amplitude.  
(2) Adjust for the flat RF envelope at exit.
9. Loosen and adjust the TG-3 nut to remove and not to make clearance between tape bottom edge and TG-3 lower flange.
10. The amount of tape curl in the play mode must satisfy the conditions below.  
(1) Amount tape curl at the TG-2 upper flange must be less than 1/10 of tape width.  
(2) There must exist no tape curl at TG-3 lower flange.



## 7-6. CTL HEAD HEIGHT CHECK/ADJUSTMENT

### Tools :

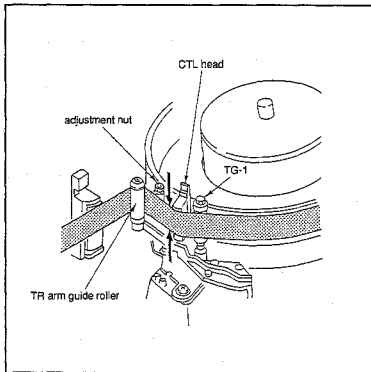
- Alignment tape CR8-1B PS : 8-960-096-86
- Dual trace oscilloscope
- Box driver (diagonal length 4.5 mm)

### Check procedure

1. Connect an oscilloscope.  
CH-1 : TP225/SS-53 board (C-1)
2. Playback the 1 kHz recorded segment 1 kHz, 0 VU (8:00 to 10:00) on the CTL track of the alignment tape CR8-1B PS.
3. Press the tape (between the CTL head and TR arm guide roller) as shown with finger, and check that the RF signal level decreases.

### Adjustment procedure

4. In the case that the signal level increases when the tape is pushed up, turn the adjustment nut as shown in clockwise for the maximum output.
5. In the case that the signal level increases when the tape is pressed down, turn the adjustment nut as shown in counter-clockwise for the maximum output.





## 7-7. CTL HEAD POSITION CHECK/ADJUSTMENT

### Tools :

Alignment tape CR2-1B PS : 8-960-096-51  
Dual trace oscilloscope  
Box driver (diagonal length 4.5 mm)  
-3 mm screw driver

### Check procedure

1. Connect an oscilloscope.  
CH-1 : TP101/VP-43P, VP-43AP board (L-2)  
CH-2 : TP102/VP-43P, VP-43AP board (P-1)  
TRIG : CH-2
2. Playback the alignment tape CR2-1B.
3. Running the tape in play mode, press the RESET button on the sub control panel to set the video tracking in the center position.
4. Press the Left and Right keys on the sub control panel which shift the video tracking. Check that the RF signal amplitude decreases when the video tracking is off tracking. (Refer to Fig-1.)
5. Press the RESET (NO) button on the sub control panel. Check that the center of the RF envelope has the maximum amplitude. (Refer to Fig-2.)
6. If the requirements in steps 4 and 5 are not satisfied, perform the next adjustment.

### Adjustment procedure

7. Loosen the two screws fixing the CTL head ass'y about 1/2 turn. Insert -3 mm screw driver tip into the cut-out of the base. Move the CTL head in the direction shown by arrow to obtain the maximum amplitude at the center of the RF envelope. (Refer to Fig-3.)

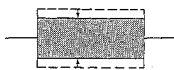


Fig-1.

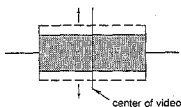


Fig-2.

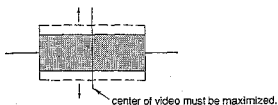
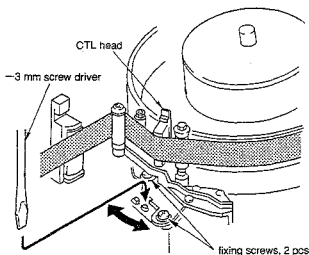


Fig-3.

## 7-8. AUDIO/TIMECODE HEAD HEIGHT CHECK/ADJUSTMENT

### Tools :

Alignment tape CR8-1B PS : 8-960-096-86

Dual trace oscilloscope

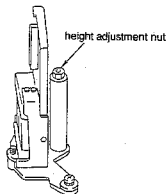
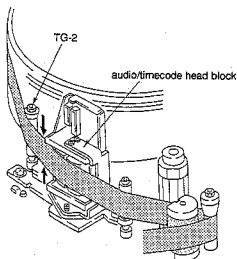
Box driver (diagonal length 4.5 mm)

### Check procedure

1. Connect an oscilloscope.  
CH-1 : TP5/AP-31P, AP-31AP board (G-1)  
CH-2 : TP205/AP-31P, AP-31AP board (D-1)
2. Set the SS-53 board switch S201-5 to on.
3. Playback the 1 kHz, 0 VU (8:00 to 10:00) segment which is the last segment of the alignment tape CR8-1B PS.
4. Press down the portion of the tape as shown (between audio/timecode head and TG-2 tape guide), or push up and check that audio level decreases in both cases.  
If the level does not decrease, perform the following adjustment.

### Adjustment procedure

5. Adjust the height adjustment nut using the boxing driver for the maximum level of both CH-1 and CH-2.  
After completing the adjustment, be sure to perform the following check/adjustment items.
6. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
7. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment.  
(Refer to section 7-10.)
8. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)
9. Perform the Audio / Timecode Head Height Check / Adjustment. (Refer to section 7-8.)
10. Set the SS-53 board switch S201-5 to off.



## 7-9. AUDIO/TIMECODE HEAD PHASE CHECK/ADJUSTMENT

### Preparation

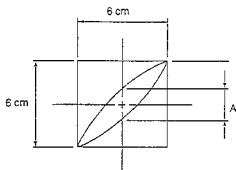
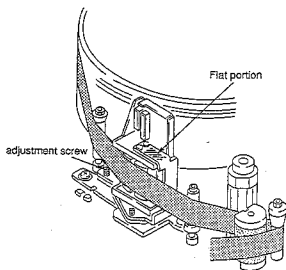
Set switch S201-2 (DOLBY switch) on SS-53 board to ON. (Refer to section 6-1.)

### Tools :

Alignment tape CR8-1B PS : 8-960-096-86  
Dual trace oscilloscope  
-2 mm screw driver

### Check procedure

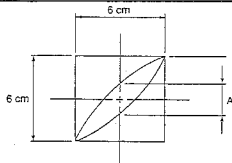
1. Connect an oscilloscope.  
CH-1 : TP5/AP-31P, AP-31AP board (G-1)  
CH-2 : TP205/AP-31P, AP-31AP board (D-1)
2. Playback the audio 10 kHz, -10 VU (3:00 to 4:55) segment of the alignment tape CR8-1B PS.
3. Obtain the Lissajous waveform on the oscilloscope. Set the vertical and horizontal amplitudes to 6 mm respectively.
4. The vertical amplitude at the center of horizontal direction must satisfy the specifications.



Specification 1 :  $A \leq 2 \text{ cm}$

### Adjustment procedure

5. If the specifications is not satisfied, turn the adjustment screw shown to satisfy the specification 1.  
After completing this adjustment, be sure to perform the following items.
6. Tap then the flat portion of the head with screw driver tip as shown. Check that the phase specification 2 is satisfied
7. Perform the Audio / Timecode Head Height Check/Adjustment. (Refer to section 7-8.)
8. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
9. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment.  
(Refer to section 7-10.)
10. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)



Specification 2 :  $A \leq 4.2 \text{ cm}$

## 7-10. AUDIO/TIMECODE HEAD-TO-TAPE CONTACT CHECK/ADJUSTMENT

### Tools :

Alignment tape CR8-1B PS : 8-960-096-86

Dual trace oscilloscope

-2 mm screw driver

### Check procedure

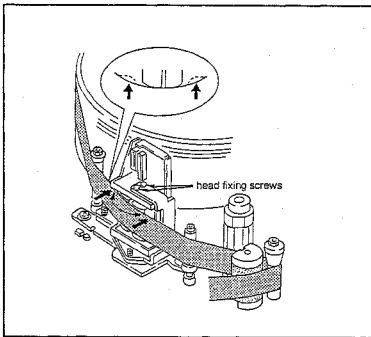
1. Connect an oscilloscope.  
CH-1 : TP5/AP-31P, AP-31AP board (G-1)  
CH-2 : TP205/AP-31P, AP-31AP board (D-1)
2. Playback the audio 10 kHz, -10 VU (3:00 to 4:55) segment of the alignment tape CR8-1B PS.
3. Press down the tape at both sides of the audio/timecode head lightly and check that audio level does not increase.  
If the level increases, perform the following adjustment.

### Adjustment procedure

4. Turn the two head fixing screws as shown by 1/4 to 1/2 turn to rotate the head so that the maximum playback level is obtained in both channels.
5. Tighten the head fixing screw  
Tightening torque: 0.2 to 0.3 N · m  
(2 to 3 kgf · cm)
6. Press down the tape at both sides of the audio/timecode head lightly and check that audio level of both channels do not increase.

After completing this adjustment, be sure to perform the following items.

7. Perform the Audio / Timecode Head Height Check / Adjustment. (Refer to section 7-8.)
8. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
9. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment. (Refer to section 7-10.)
10. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)



## 7-11. AUDIO/TIMECODE HEAD POSITION CHECK/ADJUSTMENT

### Tools :

- Alignment tape CR2-1B PS : 8-960-096-51
- Dual trace oscilloscope
- +3 mm screw driver
- 3 mm screw driver

### Check procedure

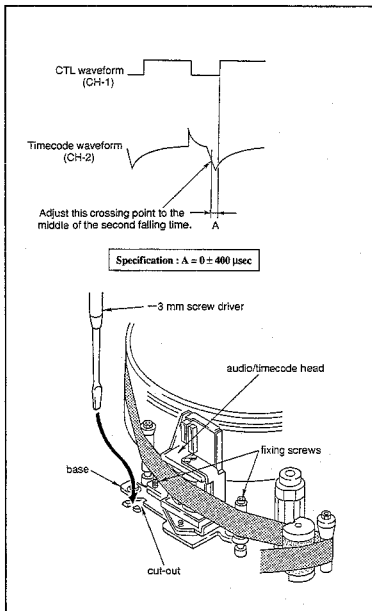
1. Connect an oscilloscope.  
CH-1 : TP203/SS-53 board (D-1)  
CH-2 : TP403/AP-31P, AP-31AP board (D-1)  
TRIG : CH-1
2. Playback the alignment tape CR2-1B PS.
3. Check that the timecode waveform time difference with respect to CTL waveform satisfy the specifications.  
If the specifications is not satisfied, perform the following adjustment.

### Adjustment procedure

4. Loosen the two head fixing screws as shown by 1/4 to 1/2 turn.
5. Insert -3 mm screw driver tip into the cut-out of base. Adjust to satisfy the specifications.
6. Tighten the head fixing screw.

After completing this adjustment, be sure to perform the following items.

7. Perform the Audio / Timecode Head Height Check / Adjustment. (Refer to section 7-8.)
8. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
9. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment. (Refer to section 7-10.)
10. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)



## 7-12. REV TAPE PATH CHECK/ADJUSTMENT

### Tools :

Alignment tape CR5-1B PS : 8-960-096-91

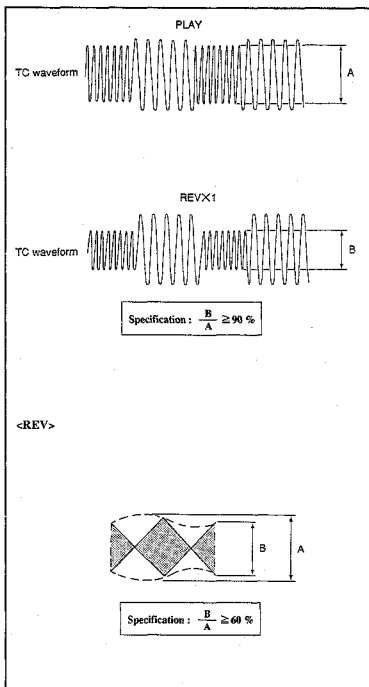
Alignment tape CR2-1B PS : 8-960-096-51

Dual trace oscilloscope

Box driver (4.5 mm diagonally)

### Check procedure

1. Connect an oscilloscope.  
CH-1 : TP403/AP-31P, AP-31AP board (D-1)
2. Playback the alignment tape CR5-1B PS and establish the play mode. Take note of the timecode output level "A".
3. Establish the REV  $\times 1$  mode. Compare the timecode output level "B" with that of play mode. Check that the specifications is satisfied.

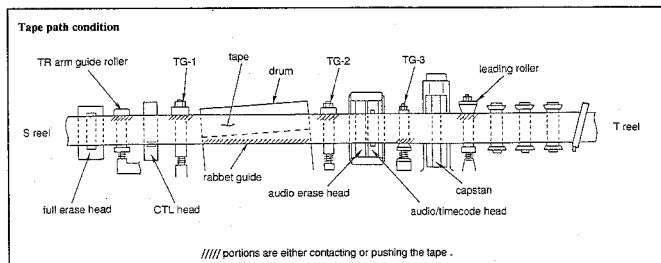


4. Connect an oscilloscope.  
CH-1 : TP101/VP-43P, VP-43AP board (L-2)  
CH-2 : TP102/VP-43P, VP-43AP board (P-1)  
TRIG : CH-2
5. Playback the alignment tape CR2-1B PS in REV  $\times 1$  mode. Check that RF waveform satisfies the specifications.

6. (1) The tape curl at the upper flanges of the TR arm guide roller, TG-1, TG-2, TG-3 and leading roller must be less than 1/10 of tape width.
- (2) There must not exist tape curl at drum rabbit guide (entrance and exit).
7. Switch the mode from play to REV  $\times 1$  tape speed. Check that the tape wrinkle disappears within one second between the leading roller - capstan - TG-3.
8. If the specifications in steps 3, 6 and 7 are not satisfied, perform the following adjustment.

#### Adjustment procedure

9. Adjust height of the leading roller to remove the tape wrinkle between the leading roller - capstan - TG-3, when switching between play - REV  $\times 1$  is repeated. The timecode output level must satisfy the step 5 specifications.
10. If the specifications in step 5 is not satisfied, check the following tape path.



### 7-13. RF SWITCHING POSITION ADJUSTMENT

After the tape path alignment (refer to section 7-2), make sure to perform the RF switching adjustment.

RF switching pulse has the AUTO and MANUAL mode adjustments.

Perform this adjustment in AUTO mode first. If the adjustment in AUTO cannot generate satisfactory result, perform this adjustment in MANUAL mode.

#### Preparation

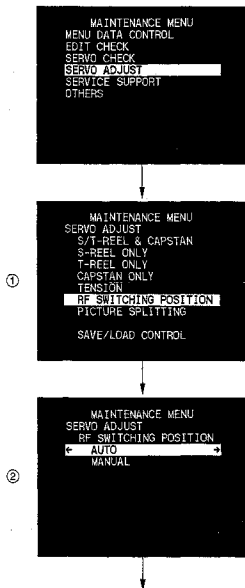
Connect the video monitor to the VIDEO OUTPUT 2 connector on the rear panel in order to display the characters.

#### Tools :

Alignment tape CR2-1B PS : 8-960-096-51

#### [AUTO Adjustment]

1. Display "MAINTENANCE MENU" on the monitor.
  - (1) Press the menu key while holding down the left arrow key on the subcontrol panel to display "MAINTENANCE MENU".
2. Press the up or down arrow key to select "SERVO ADJUST".
3. Press the right arrow key to display screen ①.
4. Press the up or down arrow key to select "RF SWITCHING POSITION".
5. Press the right arrow key to display screen ②.
6. Press the up or down arrow key to select "AUTO".





7. Press the right arrow key to display screen ③ "START OK?".

③

SERVO ADJUST MODE

START OK ?

NO KEY : RETURN TO MENU  
YES KEY : ADJUST START

8. Press the YES key.

④

SERVO ADJUST MODE

RF SWITCHING POSITION  
AUTO ADJUST

SET ALIGNMENT TAPE CR2-1B  
AND PUSH PLAY KEY.

CANCEL : MENU KEY

9. Play back alignment tape CR2-1B PS. The unit enters the automatic adjustment mode of the RF switching position.

⑤

SERVO ADJUST MODE

RF SWITCHING POSITION  
AUTO ADJUST

NOW ADJUSTING ...

CANCEL : MENU KEY

10. The adjustment is completed, and ⑥ "COMPLETE" is displayed.

Note : When the "ADJUSTMENT INCOMPLETE" is displayed on the monitor, check that the alignment tape is CR2-1B PS.

⑥

SERVO ADJUST MODE

RF SWITCHING POSITION  
AUTO ADJUST

COMPLETE

ADJUST MENU : (+) KEY

11. The alignment tape is automatically ejected after the adjustment is completed.
12. Press the left arrow key twice to return to screen ①.
13. To save the adjustment data, execute "SAVE ADJUSTING DATA" of "SAVE/LOAD CONTROL".
14. Press the menu key to display "MAINTENANCE MENU".

[MANUAL Adjustment]

1. Connect an oscilloscope.  
CH-1 : TP-103/VP-43P and VP-43AP board (L-1)  
CH-2 : TP-102/VP-43P and VP-43AP board (P-1)  
TRIG : CH-2
2. Display "MAINTENANCE MENU" on the monitor.  
(1) Press the menu key while holding down the left key of the subcontrol panel to display MAINTENANCE MENU. Then the modes are displayed on the monitor.
3. Press the up or down arrow key to select "SERVO ADJUST".



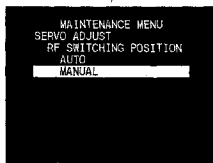
4. Press the right arrow key to display screen ①.
5. Press the up or down arrow key to select "RF SWITCHING POSITION".

①



6. Press the right arrow key to display screen ②.
7. Press the up or down key to select "MANUAL".

②



8. Press the right key to display screen ③ "START OK?".
9. Press the YES key.

③



10. Play back alignment tape CR2-1B PS.

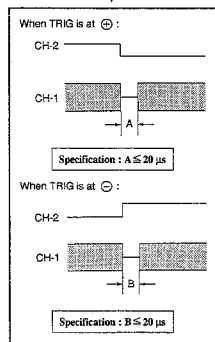
④

SERVO ADJUST MODE  
RF SWITCHING POSITION  
MANUAL ADJUST  
  
SET ALIGNMENT TAPE CR2-1B  
AND PUSH PLAY KEY.  
  
CANCEL : MENU KEY

11. Press the up or down arrow key so that the RF switching position is within the specification.

⑤

SERVO ADJUST MODE  
RF SWITCHING POSITION  
MANUAL ADJUST  
  
MINIMIZE THE GAP BETWEEN  
THE RF SIGNALS  
WITH (↑) OR (↓) KEY.  
  
NEXT : (+) KEY  
CANCEL : MENU KEY



12. Press the right arrow key to display screen ⑥.
13. The adjustment is completed, and "COMPLETE" is displayed.
14. The alignment tape is automatically ejected after the adjustment is completed.
15. Press the left key twice to return to screen ①.
16. To save the adjustment data, execute "SAVE ADJUSTING DATA" of "SAVE/LOAD CONTROL".
17. Press the menu key to display "MAINTENANCE MENU".

⑥

SERVO ADJUST MODE  
RF SWITCHING POSITION  
MANUAL ADJUST  
COMPLETE

ADJUST MENU : (+) KEY

## 7-14. PICTURE SPLITTING COMPENSATION ADJUSTMENT

This adjustment is not required usually.

Perform this adjustment only if there is picture splitting.

The "picture splitting" is a phenomenon as illustrated on the right :

### Tools :

Alignment tape CR5-1B PS : 8-960-096-91

Two video monitors :

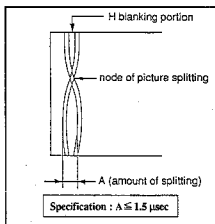
(It may not be possible to monitor a picture splitting on the monitor which uses a strong AFC.)

### Checking Method

1. Connect one of the video monitors to VIDEO OUTPUT 2 on the rear panel.
2. Connect the other monitor as follows :
  - (1) Use the BNC cable tied together, etc. to connect the video monitor to TP201/(P-1) on the VP-43P board.
  - (2) Set up the video monitor as follows :
    - H DELAY
    - AFC FAST
    - INT SYNC
3. Insert alignment tape CR5-1B PS to the set, and play back the color bar signal.
4. Check that whether there is picture splitting or not.

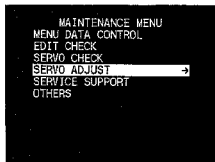
Specification :  $A \leq 1.5 \mu\text{sec}$

(1/5 of a color bar width or less)



### Adjustment Method

5. If the specification is not satisfied, perform the next adjustment.
6. Display "MAINTENANCE MENU" on the monitor.
  - (1) Press the menu key while holding down the left arrow key to display "MAINTENANCE MENU".
7. Press the up or down arrow key to select "SERVO ADJUST".
8. Press the right arrow key to display screen ①.
9. Press the up or down arrow key to select "PICTURE SPLITTING".



10. Press the right arrow key to display screen ② "START OK?".

11. Press the YES key.

②

SERVO ADJUST MODE  
  
START OK ?  
  
NO KEY : RETURN TO MENU  
YES KEY : ADJUST START

12. Play back the color bar signals (14:00 to 17:00) of alignment tape CR5-1B PS.

13. Check the position of the node of the picture splitting on the monitor.

(It is recommended to mark the position using a tape on the position.)

③

SERVO ADJUST MODE  
  
PICTURE SPLITTING  
  
PERFORM ADJUSTMENTS  
REFERRING TO SERVICE  
MANUAL (4-5).  
SET  
ALIGNMENT TAPE CR5-1B  
AND PUSH PLAY KEY.  
  
CANCEL : MENU KEY

④

SERVO ADJUST MODE  
  
PICTURE SPLITTING  
  
MEMORIZE POSITION OF  
PICTURE SPLITTING.  
  
NEXT : (+) KEY  
CANCEL : MENU KEY

14. Press the right arrow key to display screen ⑤.

15. Press the up or down key to align the positions of the node marked in step 13 and the node on the display.

⑤

SERVO ADJUST MODE  
  
PICTURE SPLITTING  
  
SHIFT THE LARGE SPLITTING  
TO THE SAME POSITION  
OF MEMORIZED POSITION  
WITH (↑) OR (↓) KEY.  
  
NEXT : (+) KEY  
CANCEL : MENU KEY

16. Press the right arrow key to display screen ⑤.
17. Press the up or down key to decrease the amount of the splitting to the minimum level.

⑥

SERVO ADJUST MODE  
PICTURE SPLITTING

REDUCE PICTURE  
SPLITTING  
WITH (←) OR (↓) KEY.

NEXT : (→) KEY  
CANCEL : MENU KEY

18. Press the right arrow key to display screen ⑦.
19. The adjustment is completed, and "COMPLETE" is displayed.
20. The alignment tape is automatically ejected after the adjustment is completed.
21. Press the left key twice to return to screen ①.
22. To save the adjustment data, execute "SAVE ADJUSTING DATA" of "SAVE/LOAD CONTROL".
23. Press the menu key to display "MAINTENANCE MENU".

⑦

SERVO ADJUST MODE  
PICTURE SPLITTING

COMPLETE

ADJUST MENU : (←) KEY

## SECTION 8 ELECTRICAL ALIGNMENT OVERVIEW

### 8-1. ADJUSTMENT COMPONENT INDEX

As to UVW-1600P, perform the adjustments marked with Ⓢ.

As to UVW-1800P, perform all adjustments as shown below.

#### AP-31/A board

ⓈRV1	CH-1 PB DOLBY OFF FREQ. RESP. (UVW-1600P) .....	11-9, 13-19
	CH-1 PB DOLBY OFF FREQ. RESP. (UVW-1800P) .....	11-11, 13-21
ⓈRV2	CH-1 PB DOLBY OFF FREQ. RESP. (UVW-1600P) .....	11-9, 13-19
	CH-1 PB DOLBY OFF FREQ. RESP. (UVW-1800P) .....	11-11, 13-21
ⓈRV3	CH-1 PB LEVEL (UVW-1600P) .....	11-10, 13-20
	CH-1 PB LEVEL (UVW-1800P) .....	11-12, 13-22
ⓈRV4	CH-1 PB LEVEL (UVW-1600P) .....	11-10, 13-20
	EE OUTPUT LEVEL (UVW-1800P) .....	11-13, 13-23
ⓈRV5	AUDIO METER (UVW-1600P) .....	11-10, 13-20
	AUDIO METER (UVW-1800P) .....	11-12, 13-22
ⓈRV201	CH-2 PB DOLBY OFF FREQ. RESP. (UVW-1600P) .....	11-9, 13-19
	CH-2 PB DOLBY OFF FREQ. RESP. (UVW-1800P) .....	11-11, 13-21
ⓈRV202	CH-2 PB DOLBY OFF FREQ. RESP. (UVW-1600P) .....	11-9, 13-19
	CH-2 PB DOLBY OFF FREQ. RESP. (UVW-1800P) .....	11-11, 13-21
ⓈRV203	CH-2 PB LEVEL (UVW-1600P) .....	11-10, 13-20
	CH-2 PB LEVEL (UVW-1800P) .....	11-12, 13-22
ⓈRV204	CH-2 PB LEVEL (UVW-1600P) .....	11-10, 13-20
	EE OUTPUT LEVEL (UVW-1800P) .....	11-13, 13-23
ⓈRV205	AUDIO METER (UVW-1600P) .....	11-10, 13-20
	AUDIO METER (UVW-1800P) .....	11-12, 13-22

#### AR-14 board

LV101	CH-1 BIAS TRAP .....	11-14, 13-24
LV201	CH-2 BIAS TRAP .....	11-14, 13-24
LV301	CH-1 ERASE TUNE .....	11-18
LV311	CH-2 ERASE TUNE .....	11-18
LV321	TC ERASE TUNE .....	11-18
RV106	CH-2 OVERALL LEVEL .....	11-14, 13-25
RV107	CH-1 OVERALL FREQ. RESP. ....	11-14, 13-26
RV108	CH-1 INSERT CROSSTALK .....	11-17, 13-26
RV109	CH-1 INSERT CROSSTALK .....	11-17, 13-26
RV110	CH-1 INSERT CROSSTALK .....	11-17, 13-26
RV111	CH-1 TC INSERT CROSSTALK .....	11-16, 13-26
RV112	CH-1 TC INSERT CROSSTALK .....	11-16, 13-26
RV206	CH-2 OVERALL LEVEL .....	11-14, 13-25
RV207	CH-2 OVERALL FREQ. RESP. ....	11-14, 13-26
RV208	CH-2 INSERT CROSSTALK .....	11-17, 13-27
RV209	CH-2 INSERT CROSSTALK .....	11-17, 13-27
RV210	CH-2 INSERT CROSSTALK .....	11-17, 13-27
RV211	CH-2 TC INSERT CROSSTALK .....	11-16, 13-26
RV212	CH-2 TC INSERT CROSSTALK .....	11-16, 13-26
RV301	CH-1 BIAS CURRENT .....	11-14, 13-24
RV302	CH-1 BIAS CURRENT .....	11-14, 13-24

#### SS-53 board

ⓈCV1	CHARACTER SIZE .....	9-3
------	----------------------	-----

#### RP-70 board

RV1	YA REC CURRENT .....	12-64, 13-32
RV2	YA REC CURRENT FREQ. RESP. ....	12-63, 13-31
RV101	YB REC CURRENT .....	12-64, 13-32
RV102	YB REC CURRENT FREQ. RESP. ....	12-63, 13-31
RV201	CA REC CURRENT .....	12-68, 13-36
RV202	CA REC CURRENT FREQ. RESP. ....	12-67, 13-35
RV301	CB REC CURRENT .....	12-68, 13-36
RV302	CB REC CURRENT FREQ. RESP. ....	12-67, 13-35



# TBC-25 board

CV700	INTERNAL SC FREQ .....	12-22
CV701	HCK VCXO CENTER .....	12-23
LV300	Y WCK NORMAL VCO CENTER .....	12-23
LV400	C WCK NORMAL VCO CENTER .....	12-23
RV100	PB Y A/D INPUT LEVEL .....	12-27
RV200	PB C A/D INPUT LEVEL .....	12-28
RV300	PB VIDEO PHASE .....	12-44, 13-43
RV301	Y WCK FREQ. ....	12-24
RV400	PB COMPOSITE Y/C DELAY .....	12-46, 13-45, 13-56
RV401	C WCK FREQ. ....	12-25
RV500	PB COMPONENT Y LEVEL ....	12-27, 13-38, 13-48
RV501	PB COMPONENT B-Y LEVEL .....	12-28, 13-38, 13-49
RV502	PB COMPONENT R-Y LEVEL .....	12-29, 13-39, 13-50
RV700	PB COMPOSITE ENCODE AXIS .....	12-30, 13-40, 13-51
RV701	INTERNAL SC PHASE .....	12-31, 13-46
RV702	PB COMPOSITE ENCODE AXIS .....	12-30, 13-40, 13-51
RV703	REF CF PHASE .....	12-32

# VRA-5 board

CV301	BURST LOCK LOOP VCXO CENTER .....	12-49
LV301	H LOCK LOOP VCO CENTER .....	12-48
RV101	COMPOSITE S-C A/D INPUT LEVEL .....	12-52
RV102	COMPONENT R-Y A/D INPUT LEVEL .....	12-51
RV103	OA COMPONENT C-C DELAY .....	12-79, 13-66
RV104	COMPONENT B-Y A/D INPUT LEVEL .....	12-51
RV105	OA S-Y LEVEL .....	12-54
RV201	OA COMPOSITE Y LEVEL ....	12-52, 12-73, 13-60
RV202	OA COMPOSITE C LEVEL .....	12-53, 12-74, 13-61
RV203	OA COMPONENT C LEVEL ...	12-51, 12-72, 13-59
RV301	BURST LOCK LOOP PHASE ERROR CENTER .....	12-49
RV302	OA VIDEO PHASE .....	12-55, 12-77, 13-64
RV303	OA COMPOSITE Y/C DELAY .....	12-81, 13-68
RV304	OA COMPOSITE Y/C DELAY .....	12-79, 13-66
RV305	OA S Y/C DELAY .....	12-82, 13-69
RV306	COMPOSITE SCH DETECT .....	12-57
RV501	OA COMPONENT Y LEVEL ...	12-50, 12-71, 13-58
RV502	Y DEVIATION .....	12-58, 12-59
RV503	Y CARRIER SET .....	12-58, 12-59
RV602	C DEVIATION .....	12-60, 12-61
RV603	C CARRIER .....	12-60, 12-61

# VP-43/A board

RV101	PB COMPONENT Y FREQ. RESP. ....	12-20, 13-47
RV102	PB COMPONENT Y FREQ. RESP. ....	12-20, 13-47
RV103	PB Y RF LEVEL .....	12-17
RV201	PB Y DEMOD. OUTPUT LEVEL .....	12-19
RV301	PB COMPONENT C FREQ. RESP. ....	12-21, 13-48
RV302	PB COMPONENT C FREQ. RESP. ....	12-21, 13-48
RV303	PB C RF LEVEL .....	12-18
RV401	PB C DEMOD. OUTPUT LEVEL .....	12-19
RV501	PB COMPOSITE SYNC LEVEL .....	12-37
RV502	PB COMPONENT Y SYNC LEVEL .....	12-34
RV503	PB COMPONENT Y LEVEL .....	12-34
RV504	PB COMPOSITE 1 LEVEL .....	12-37
RV505	PB S-Y LEVEL .....	12-41
RV506	PB COMPOSITE 2 LEVEL .....	12-37
RV601	PB COMPOSITE SC LEAK .....	12-38, 13-52
RV602	PB COMPOSITE SC LEAK .....	12-38, 13-52
RV603	PB COMPOSITE 1 BURST LEVEL ....	12-39, 13-55
RV604	PB COMPOSITE 1 C LEVEL (R-Y) ....	12-39, 13-54
RV605	PB COMPOSITE 1 C LEVEL (B-Y) ....	12-39, 13-54
RV606	PB S-C LEVEL .....	12-42, 13-55
RV701	PB COMPONENT Y/C DELAY .....	12-47, 13-57
RV702	PB COMPONENT Y/C DELAY .....	12-47, 13-57
RV703	PB COMPONENT R-Y LEVEL .....	12-35
RV704	PB COMPONENT B-Y LEVEL .....	12-36

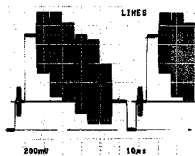
## 8-2. REQUIRED EQUIPMENT

Equipment		Equivalent	Note
Oscilloscope		TEKTRONIX 2445	more than 150 MHz
Signal Generator	Component	TEKTRONIX TSG-300/TSG-131A (OP. 03)	
	Composite	TEKTRONIX TSG-131A (OP. 03)/1411	
	Y/C	TEKTRONIX TSG-131A (OP. 03)	S-VIDEO SG
Waveform Monitor	Component	TEKTRONIX WFM300/300A/1781/1765 (OP. SC)	
	Composite	TEKTRONIX 1751/1781/1765 (OP. SC)	with SCH meter
Picture Monitor			
Audio Signal Generator		HP 8904	
Audio Level Meter		HP 3400A	
Frequency Counter		ADVANTEST TR5821AK	
Digital Voltmeter		ADVANTEST TR6845	

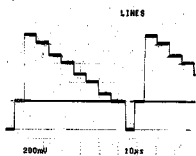
### 8-3. TEST SIGNAL

#### 1. 100 % COLOR BARS

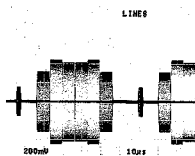
COMPOSITE



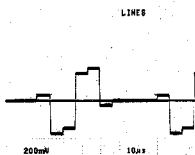
Y, S-Y



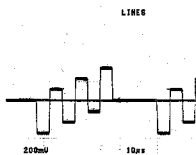
S-C



R-Y

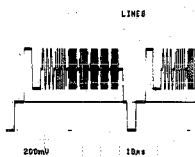


B-Y

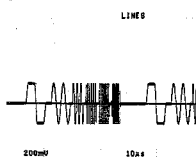


#### 2. 60 % MULTIBURST

Y

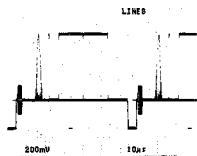


C

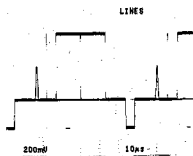


### 3. PULSE & BAR

COMPOSITE

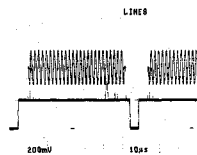


Y

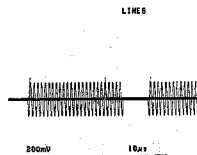


### 4. 50 % BOWTIE

Y







C



## 8-4. MAINTENANCE MENU

The servo alignment is done by Servo system is adjusted automatically or semiautomatically in the maintenance menu, SERVO ADJUST. For details, refer to section 4-5, SERVO ADJUST.

### How to enter the maintenance menu

1. While pressing the  key, press the MENU key.  
Then the unit enters into the maintenance menu, and the menu picture is displayed on the monitor.
2. Press the ,  keys to select the item to change.  
Move the high lighted item to select the item on a monitor display.
3. Press the  key at the item to select.  
This selects the high lighted item.

### How to close the maintenance menu

Press the MENU key.

## SECTION 9 POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

### [Equipments Required]

- Digital Voltmeter (ADVANTEST TR6845)
- Picture Monitor
- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)

### Contents

TIME min. s	VIDEO TRACK	AFM
0 : 00	RF Sweep	No-Signal
2 : 00	Marker 1, 2, 4, 6, 8, 10, 12 MHz	
5 : 00	60 % H-Sweep (CTDM) Marker 0.5, 1, 2, 3, 4, 5 MHz	
8 : 00	Pulse & Bar (CTDM)	
11 : 00	60 % Multi Burst Y : 0.5, 1, 2, 4, 5, 5.5 MHz C : 0.2, 0.5, 1, 1.5, 2 MHz	
14 : 00	Pulse & Bar	
16 : 30	100 % Color Bars	400 Hz Sine Wave 25 kHz Deviation
17 : 00		75 kHz Deviation
19 : 00	50 % Bowtie & 10T	No-Signal
22 : 00	Line 17A Signal	
24 : 00	Quad Phase	
26 : 00	50 % Flat Field	
28 : 00	100 % Color Bars with Dropout	
30 : 00	Composite H-Sweep with VISC	

## 9-1. SWITCHING REGULATOR VOLTAGE ADJUSTMENT (+5 V)

### [NOTE]

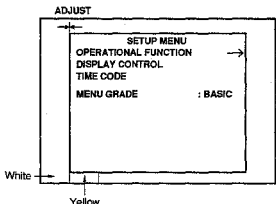
- Avoid alignment of the power supply unless it is positive that alignment is necessary.

Preparations for Adjustment	Adjustments • Specification
<ul style="list-style-type: none"><li>• Set the <b>RV201</b>/switching regulator to mechanical center position.</li></ul> <p>NOTE: When checking, be careful not to short between connector pins.</p>	CN3-6 pin/SS-53 (P-1) <b>RV201</b> /switching regulator  spec. : $+5.0 \pm 0.1$ V dc

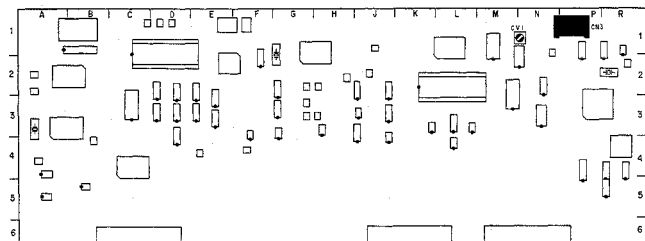
## 9-2. SWITCHING REGULATOR VOLTAGE CHECK

Preparations for Adjustment	Adjustments • Specification												
NOTE: When checking, be careful not to short between connector pins.	(Voltage checks)  <table><tr><td>CN3-1pin/SS-53 (P-1)</td><td><math>+12.0 \pm 0.75</math> V dc</td></tr><tr><td>CN3-2pin/SS-53 (P-1)</td><td><math>+6.5^{+0.75}_{-0.5}</math> V dc</td></tr><tr><td>CN3-4pin/SS-53 (P-1)</td><td><math>+8.5 \pm 0.5</math> V dc</td></tr><tr><td>CN3-5pin/SS-53 (P-1)</td><td><math>+12.5 \pm 1</math> V dc</td></tr><tr><td>CN3-6pin/SS-53 (P-1)</td><td><math>+5.0 \pm 0.25</math> V dc</td></tr><tr><td>CN3-8pin/SS-53 (P-1)</td><td><math>+5.25 \pm 0.35</math> V dc</td></tr></table> +5 V specification: When performing only the voltage check, the specification shown in not section 9-1 ( $+5.0 \pm 0.1$ V) but section 9-2 ( $+5.0 \pm 0.25$ V) must be satisfied.	CN3-1pin/SS-53 (P-1)	$+12.0 \pm 0.75$ V dc	CN3-2pin/SS-53 (P-1)	$+6.5^{+0.75}_{-0.5}$ V dc	CN3-4pin/SS-53 (P-1)	$+8.5 \pm 0.5$ V dc	CN3-5pin/SS-53 (P-1)	$+12.5 \pm 1$ V dc	CN3-6pin/SS-53 (P-1)	$+5.0 \pm 0.25$ V dc	CN3-8pin/SS-53 (P-1)	$+5.25 \pm 0.35$ V dc
CN3-1pin/SS-53 (P-1)	$+12.0 \pm 0.75$ V dc												
CN3-2pin/SS-53 (P-1)	$+6.5^{+0.75}_{-0.5}$ V dc												
CN3-4pin/SS-53 (P-1)	$+8.5 \pm 0.5$ V dc												
CN3-5pin/SS-53 (P-1)	$+12.5 \pm 1$ V dc												
CN3-6pin/SS-53 (P-1)	$+5.0 \pm 0.25$ V dc												
CN3-8pin/SS-53 (P-1)	$+5.25 \pm 0.35$ V dc												

### 9-3. CHARACTER POSITION ADJUSTMENT

Preparations for Adjustment	Adjustments • Specification
<ul style="list-style-type: none"> <li>• CHARACTER switch (sub control panel) : ON</li> <li>• Press the MENU button on the sub control panel once.</li> <li>• PB mode Color-bar/CR5-1B PS (14:00 - 17:00)</li> </ul> <p>• After adjustment is completed, press the MENU button and display the original picture.</p>	<p>VIDEO 2 (SUPER) OUTPUT connector (Terminated at 75 ohm)</p> <p>● CV1/SS-53 (N-1)</p> <p>Adjust the setup menu display, and position the left side frame at the bounder between the white and yellow signals of the color bars signal. Then, position the all sides frames at the center of the monitor.</p> 

#### SS-53 BOARD





## **SECTION 10**

### **SERVO ALIGNMENT**

Servo system is adjusted automatically or semiautomatically in the maintenance menu.

For details, refer to section 4-5, SERVO ADJUST.

## SECTION 11

### AUDIO / TIME CODE SYSTEM ALIGNMENT

#### [EQUIPMENT]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Audio Signal Generator (HP 8904 or equivalent)
- Audio Level Meter (HP 3400A or equivalent)
- Blank Tape (metal) BCT-20MA or equivalent

NOTE : "Blank Tape" indicates a cassette tape on which no video / audio signals are recorded.

- Alignment Tape CR8-1B PS (Part No. 8-960-096-86)

#### Contents

TIME min. s	AUDIO TRACK
0 : 00	1 kHz / 0 VU
3 : 00	15 kHz / 0 VU
5 : 00	1 kHz / - 20 VU
6 : 00	40 kHz / - 20 VU
6 : 30	7 kHz / - 20 VU
7 : 00	10 kHz / - 20 VU
7 : 30	15 kHz / - 20 VU
8 : 00	15 kHz / - 20 VU

- \* 1. When this tape is reproduced in the audio reference level check or adjustment, the output level (0 dB) should be corrected according to the correction value as follows.

example) Correction value = - 0.5 dB

Output level = 0 dB - 0.5 dB = - 0.5 dB

## [SWITCH / VOLUME / SETUP MENU SETTING]

This setting should be changed in position unless otherwise specified.

### <Connector Panel>

AUDIO INPUT CH-1 600  $\Omega$  : ON

AUDIO INPUT CH-2 600  $\Omega$  : ON

### <Sub Control Panel>

TC INPUT EXT / INT : INT

CTL / LTC / U-BIT : LTC

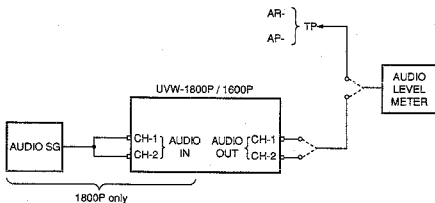
CHARACTER : ON

REMOTE / LOCAL : LOCAL

### <Switch Setting on Printed Circuit Board>

S201-2 / SS-53 : CLOSE (ON) ..... NR OFF

## [CONNECTION]



## [PRECAUTION AND NOTES ON ALIGNMENT]

### Precaution

Cleaning of stationary heads

Clean three stationary heads by the cleaning piece moistened with cleaning fluid.

After the fluid blow off, wipe off the heads by a not-weaved cloth or cleaning piece.

### Making the Tape which not Record Audio Signals

Sub Control Panel switch setting

TC INPUT EXT / INT : INT

Level volume setting

CH-1 / CH-2 REC VR : MIN

Recording

Record the blank tape BCT-20MA (or equivalent) from the top to the end.

(The tape which recorded CTL and TC without audio signals is completed, under the above-mentioned operation.)

### Notes for Alignment

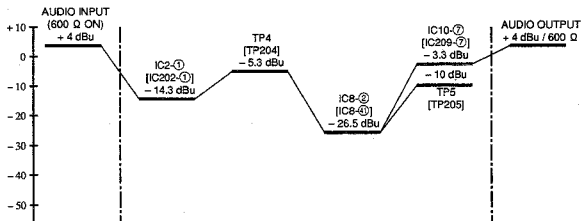
- AUDIO MONITOR is terminated by 47 k $\Omega$ .
- AUDIO OUTPUT are terminated by 600  $\Omega$ . (except designated in particular)
- When the alignment tape is played back, specification should be corrected according to the correction value mentioned in the tape level.
- The alignment tape is used within the limits of about 50 times and recommend to manage by marking.

# [LEVEL DIAGRAMS]

## AUDIO SYSTEM LEVEL DIAGRAM

REC / EE MODE

REC LEVEL CONTROL : SET + 4 dBu ON OUTPUT

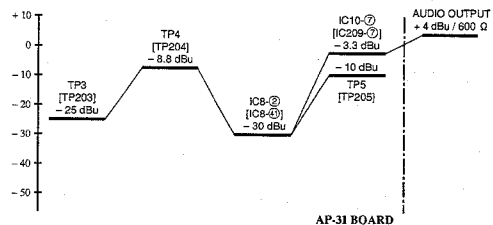


AP-31 BOARD

BOARD	TEST POINT	LEVEL		MODE
		dBu	mV rms	
AP-31	AUDIO IN	+4	1227.7	REC / EE
	TP4 [TP204]	-5.3	420.8	REC / EE
	AUDIO OUT	+4 *	1227.7	REC / EE

[ ] ..... CH-2, \* ..... 600  $\Omega$  TERMINATED

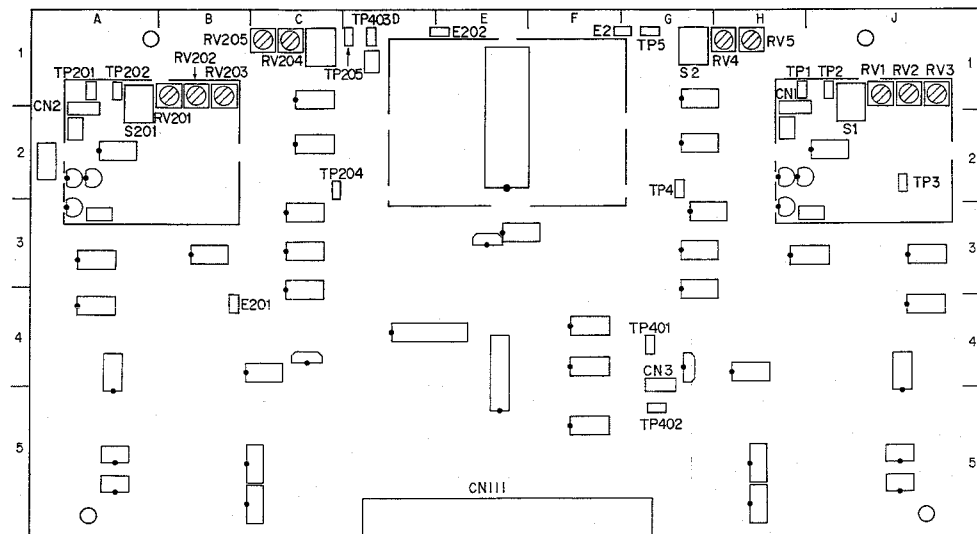
PB MODE (CR8-1B PS : 1 kHz, 0 VU PORTION)



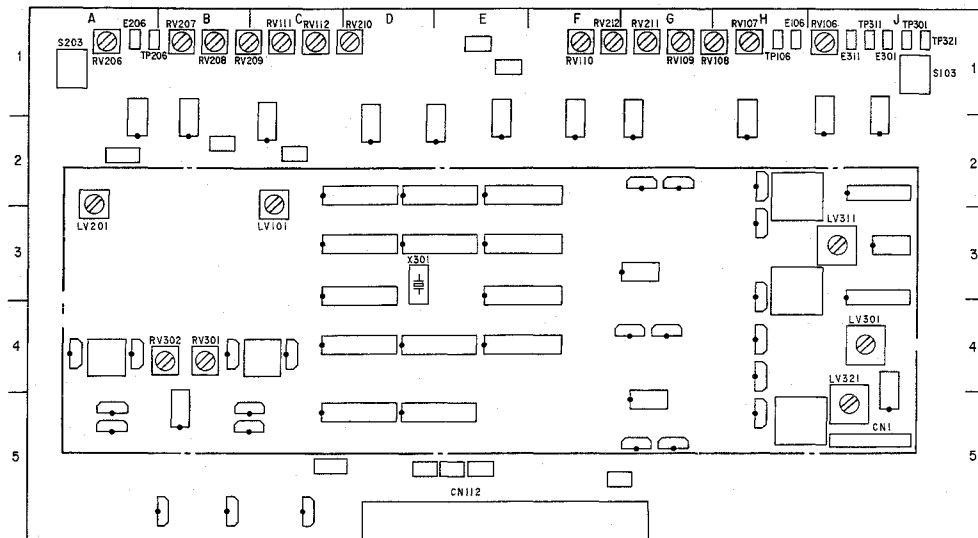
BOARD	TEST POINT	LEVEL		MODE
		dBu	mV rms	
AP-31	TP3 [TP203]	-25	43.6	PB
	TP4 [TP204]	-8.8	281.2	PB
	TP5 [TP205]	-10	245.0	PB
	AUDIO OUT	+4 *	1227.7	PB

[ ] .....CH-2, \* .....600 Ω TERMINATED

AP-31 / 31A Board (A side)



AR-14 Board (A side)





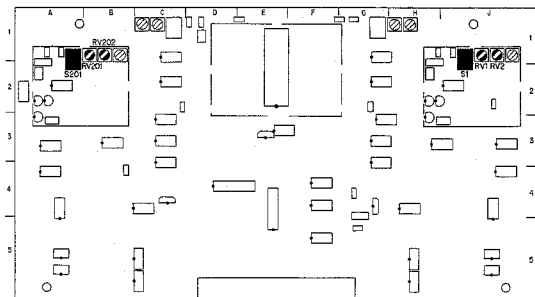
# UVW-1600P

## 11-1. PB MODE ADJUSTMENT

### 11-1-1. PB Dolby off Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications										
<ul style="list-style-type: none"> <li>PB mode</li> <li>1 kHz, 7 kHz, 10 kHz, 15 kHz, -20 VU / CR8-1B PS (5:00-8:00)</li> </ul>	<p>AUDIO OUTPUT CH-1 / 2</p> <p>CH-1            ⚙ RV1 (10 kHz) / AP-31A (J-1)            ⚙ RV2 (7 kHz) / AP-31A (J-1)</p> <p>CH-2            ⚙ RV201 (10 kHz) / AP-31A (J-1)            ⚙ RV202 (7 kHz) / AP-31A (J-1)</p> <p>Adjust alternately</p> <p>If the specification of the high frequency is not satisfied, change the following switches and adjust again.            CH-1 S1 / AP-31A (J-1)            CH-2 S201 / AP-31A (A-1)</p> <p>Spec.</p> <table border="1"> <thead> <tr> <th>FREQUENCY [Hz]</th><th>OUTPUT LEVEL [dB]</th></tr> </thead> <tbody> <tr> <td>1 k</td><td>0 (REF)</td></tr> <tr> <td>7 k</td><td>0 ± 0.2</td></tr> <tr> <td>10 k</td><td>0 ± 0.2</td></tr> <tr> <td>15 k</td><td>-0.5 ± 0.5</td></tr> </tbody> </table>	FREQUENCY [Hz]	OUTPUT LEVEL [dB]	1 k	0 (REF)	7 k	0 ± 0.2	10 k	0 ± 0.2	15 k	-0.5 ± 0.5
FREQUENCY [Hz]	OUTPUT LEVEL [dB]										
1 k	0 (REF)										
7 k	0 ± 0.2										
10 k	0 ± 0.2										
15 k	-0.5 ± 0.5										

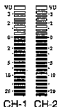
AP-31A BOARD (A side)



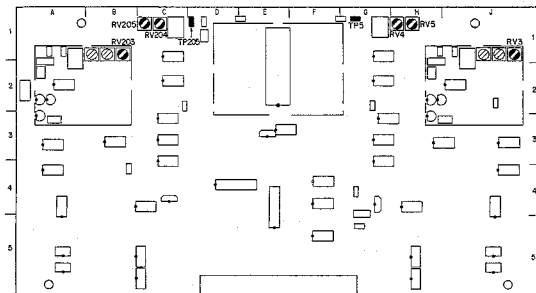
### 11-1-2. PB Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>PB mode</li> <li>1 kHz, 0 VU / CR8-1B PS</li> <li>(0:00 - 3:00)</li> </ul>	Step 1
	<div>CH-1</div> <div>TP5 / AP-31A (G-1)</div> <div>RV3 / AP-31A (J-1)</div> <div>CH-2</div> <div>TP205 / AP-31A (D-1)</div> <div>RV203 / AP-31A (B-1)</div>
	Spec. $-10.0 \pm 0.1$ dBu
	Step 2
	AUDIO OUTPUT CH-1 / 2
	<div>CH-1</div> <div>RV4 / AP-31A (H-1)</div> <div>CH-2</div> <div>RV204 / AP-31A (C-1)</div>
	Spec. $+4.0 \pm 0.2$ dBu

### 11-1-3. Audio Meter Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>PB mode</li> <li>1 kHz, 0 VU / CR8-1B PS</li> <li>(0:00 - 3:00)</li> </ul>	Audio meter
	<div>RV5 / AP-31A (I-1)</div> <div>RV205 / AP-31A (C-1)</div>
	
	Spec. The segment one step above 0 VU should be dimly lit

### AP-31A BOARD (A side)



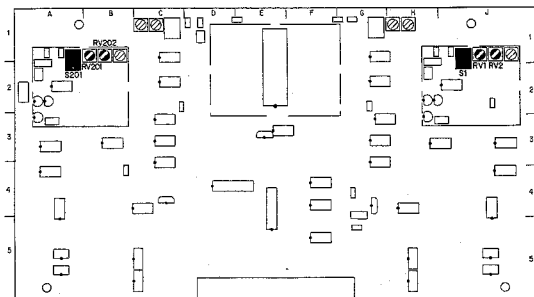
# UVW-1800P

## 11-1. PB MODE ADJUSTMENT

### 11-1-1. PB Dolby off Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications										
<ul style="list-style-type: none"><li>• PB mode</li><li>1 kHz, 7 kHz, 10 kHz,</li><li>15 kHz, -20 VU / CR8-1B PS</li><li>(5:00 - 8:00)</li></ul>	<p>AUDIO OUTPUT CH-1 / 2</p> <p>CH-1</p> <ul style="list-style-type: none"><li>Ⓞ RV1 (10 kHz) / AP-31 (J-1)</li><li>Ⓞ RV2 (7 kHz) / AP-31 (J-1)</li></ul> <p>CH-2</p> <ul style="list-style-type: none"><li>Ⓞ RV201 (10 kHz) / AP-31 (B-1)</li><li>Ⓞ RV202 (7 kHz) / AP-31 (B-1)</li></ul> <p>Adjust alternately</p> <p>If the specification of the high frequency is not satisfied, change the following switches and adjust again.</p> <p>CH-1 S1 / AP-31 (J-1)</p> <p>CH-2 S201 / AP-31 (A-1)</p> <p>Spec.</p> <table><tr><th>FREQUENCY [Hz]</th><th>OUTPUT LEVEL [dB]</th></tr><tr><td>1 k</td><td>0 (REF)</td></tr><tr><td>7 k</td><td>0 ± 0.2</td></tr><tr><td>10 k</td><td>0 ± 0.2</td></tr><tr><td>15 k</td><td>-0.5 ± 0.5</td></tr></table>	FREQUENCY [Hz]	OUTPUT LEVEL [dB]	1 k	0 (REF)	7 k	0 ± 0.2	10 k	0 ± 0.2	15 k	-0.5 ± 0.5
FREQUENCY [Hz]	OUTPUT LEVEL [dB]										
1 k	0 (REF)										
7 k	0 ± 0.2										
10 k	0 ± 0.2										
15 k	-0.5 ± 0.5										

AP-31 BOARD (A side)

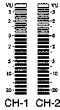


## 11-1-2. PB Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode 1 kHz, 0 VU / CR8-1B PS (0:00 – 3:00)</li> </ul>	<div> <div>CH-1</div> <div>TP5 / AP-31 (G-1)</div> <div>● RV3 / AP-31 (J-1)</div> </div> <div> <div>CH-2</div> <div>TP205 / AP-31 (D-1)</div> <div>● RV203 / AP-31 (B-1)</div> </div> <p>Spec. <math>-10.0 \pm 0.1</math> dBu</p> <p>[Check] AUDIO OUTPUT CH-1 / 2</p> <p>Spec. <math>+4.0 \pm 0.2</math> dBu</p>

## 11-2. EE MODE ADJUSTMENT

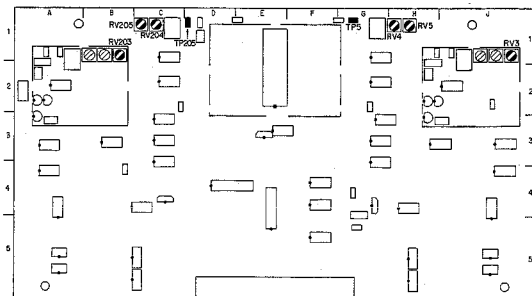
### 11-2-1. EE Input Level / Audio Meter Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• AUDIO INPUT CH-1 / 2; 1 kHz, +4.00 dBu</li> <li>• EE mode</li> </ul>	<p>Step 1</p> <div> <div>CH-1</div> <div>TP5 / AP-31 (G-1)</div> <div>● REC VR / Sub-control Panel</div> </div> <div> <div>CH-2</div> <div>TP205 / AP-31 (D-1)</div> <div>● REC VR / Sub-control Panel</div> </div> <p>Spec. <math>-10.00 \pm 0.05</math> dBu</p> <p>Step 2</p> <p>AUDIO METER</p> <div> <div>● RV5 / AP-31 (H-1)</div> <div>● RV205 / AP-31 (C-1)</div> </div>  <p>Spec. The segment one step above 0 VU should be dimly lit</p>

## 11-2-2. EE Output Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1 / 2; 1 kHz, +4.0 dBu</li> <li>EE mode</li> </ul>	<p>AUDIO OUTPUT CH-1 / 2</p> <p>CH-1 ● RV4 / AP-31 (H-1)</p> <p>CH-2 ● RV204 / AP-31 (C-1)</p> <p>Spec. +4.0 ± 0.2 dBu</p>

AP-31 BOARD (A side)



SS-53 BOARD (A side)

APPLICATION 11-4-2.



### 11-3. REC MODE ADJUSTMENT

#### 11-3-1. Bias Trap Adjustment

Conditions for adjustment	Adjustment point • Specifications	
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1/2;</li> <li>No signal</li> <li>REC mode</li> <li>Blank tape</li> </ul>	CH-1	CH-2
	TP106 / AR-14 (H-1) GND : E106 (H-1) ⚙️ LV101 / AR-14 (C-2)	TP206 / AR-14 (A-1) GND : E206 (A-1) ⚙️ LV201 / AR-14 (A-2)
Spec. The leak of bias → Minimize ( $\leq -30$ dBu)		

#### 11-3-2. Bias Current Adjustment

Conditions for adjustment	Adjustment point • Specifications	
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1/2;</li> <li>No signal</li> <li>REC mode</li> <li>Blank tape</li> </ul>	Step 1	
	TP1 / AP-31 (H-1) GND : TP2 (J-1) ⚙️ T101 / AR-14 (C-4)	TP201 / AP-31 (A-1) GND : TP202 (A-1) ⚙️ T201 / AR-14 (A-4)
Spec. Bias current → Maximize		
	Step 2	
	TP1 / AP-31 (H-1) GND : TP2 (J-1) ⚙️ RV301 / AR-14 (B-4)	TP201 / AP-31 (A-1) GND : TP202 (A-1) ⚙️ RV302 / AR-14 (B-4)
Spec. $16 \pm 1$ mV rms		

### 11-4. OVERALL ADJUSTMENT

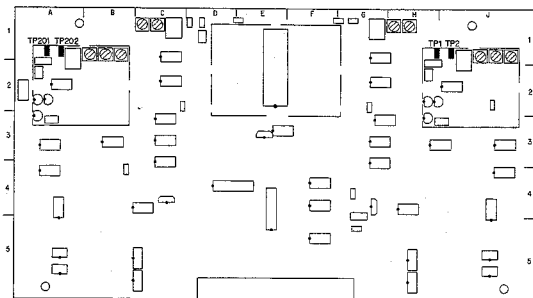
#### 11-4-1. Overall Level Adjustment

Conditions for adjustment	Adjustment point • Specifications	
Step 1 • AUDIO INPUT CH-1/2; 1 kHz, +4 dBu • Playback the recorded portion. Blank tape	AUDIO OUTPUT CH-1/2  Spec. + 4.0 ± 0.5 dBu  When specification is not satisfied → Step 2	
Step 2 • AUDIO INPUT CH-1/2; 1 kHz, +4 dBu • REC mode Blank tape	CH-1 TP106 / AR-14 (H-1) Ⓢ RV106 / AR-14 (J-1)	CH-2 TP206 / AR-14 (A-1) Ⓢ RV206 / AR-14 (A-1)
Correct the difference level from the center value in Step 1.		
After the adjustment, check that perform Step 1.		

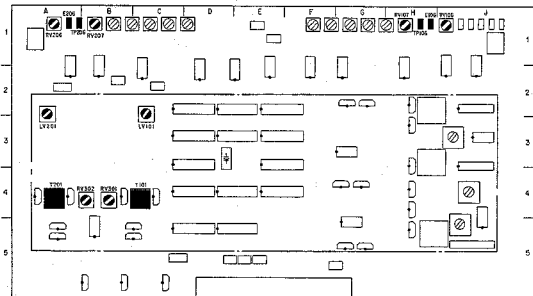
#### 11-4.2. Overall Frequency Response Adjustment (Dolby on)

Conditions for adjustment	Adjustment point • Specifications
<b>Step 1</b> <ul style="list-style-type: none"> <li>AUDIO INPUT CH-1/2; 12.5 kHz, +4 dBu</li> <li>S201-2/SS-53 (B-1); OPEN (OFF).....NR ON</li> <li>Playback the recorded portion. Blank tape</li> </ul>	<b>AUDIO OUTPUT CH-1/2</b>  <b>Spec. <math>+3.5 \pm 0.5</math> dBu</b>  When specification is not satisfied → Step 2
<b>Step 2</b> <ul style="list-style-type: none"> <li>AUDIO INPUT CH-1/2; 12.5 kHz, +4 dBu</li> <li>S201-2/SS-53 (B-1); OPEN (OFF).....NR ON</li> <li>REC mode Blank tape</li> </ul>	<div style="display: flex; justify-content: space-between;"> <div> <b>CH-1</b>                          TP106 / AR-14 (H-1)                          ● RV107 / AR-14 (J-1)                     </div> <div> <b>CH-2</b>                          TP206 / AR-14 (A-1)                          ● RV207 / AR-14 (A-1)                     </div> </div> <p>Correct the difference level <math>\times 0.8</math> from the center value in Step 1.</p> <p>After the adjustment, check that perform Step 1.</p>

AP-31 BOARD (A side)



AR-14 BOARD (A side)

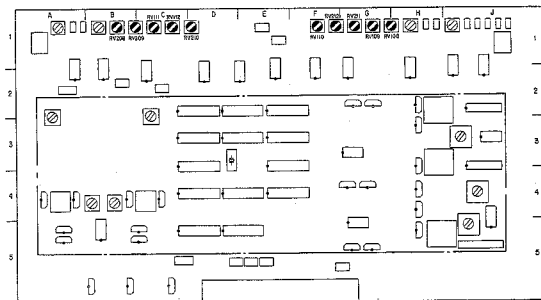


## 11-5. INSERT CROSS TALK ADJUSTMENT

### 11-5-1. TC Insert Crosstalk Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1 / 2 ; No signal</li> <li>TC insert mode Tape which not recorded audio signal</li> </ul> <p>[Putting the unit into TC insert mode] Select TC INSERT or EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel TC insert mode.</p> <p>[Cancel of TC insert mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-1 / 2</p> <p>CH-1            ⚙ RV111 / AR-14 (C-1)            ⚙ RV112 / AR-14 (C-1)</p> <p>CH-2            ⚙ RV211 / AR-14 (G-1)            ⚙ RV212 / AR-14 (F-1)</p> <p>Spec. The leak of TC signal → Minimize (<math>\leq -16</math> dBu)</p> <p>Adjust CH-1 and CH-2 by the each two RVs alternately</p>

AR-14 BOARD (A side)





### 11-5-2. Audio CH-1 Insert Crosstalk Adjustment

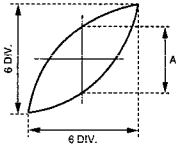
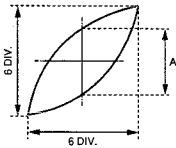
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1 ; 15 kHz, +4.0 dBu</li> <li>AUDIO INPUT CH-2 ; No signal</li> <li>AUDIO CH-1; Insert mode Tape which not recorded audio signal</li> </ul> <p>[Putting the unit into AUDIO CH-1 insert mode] Select A1 INSERT of EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel AUDIO CH-1 insert mode.</p> <p>[Cancel of AUDIO CH-1 mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-2</p> <ul style="list-style-type: none"> <li>RV108 / AR-14 (H-1)</li> <li>RV109 / AR-14 (G-1)</li> <li>RV110 / AR-14 (F-1)</li> </ul> <p>Spec. The leak of CH-1 → Minimize (<math>\leq -14</math> dBu)</p> <p>Adjust three RVs alternately</p>

### 11-5-3. Audio CH-2 Insert Crosstalk Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1 ; No signal</li> <li>AUDIO INPUT CH-2 ; 15 kHz, +4.0 dBu</li> <li>AUDIO CH-2; Insert mode Tape which not recorded audio signal</li> </ul> <p>[Putting the unit into AUDIO CH-2 insert mode] Select A2 INSERT of EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel AUDIO CH-2 insert mode.</p> <p>[Cancel of AUDIO CH-2 mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-1</p> <ul style="list-style-type: none"> <li>RV208 / AR-14 (B-1)</li> <li>RV209 / AR-14 (B-1)</li> <li>RV210 / AR-14 (D-1)</li> </ul> <p>Spec. The leak of CH-1 → Minimize (<math>\leq -14</math> dBu)</p> <p>Adjust three RVs alternately</p>

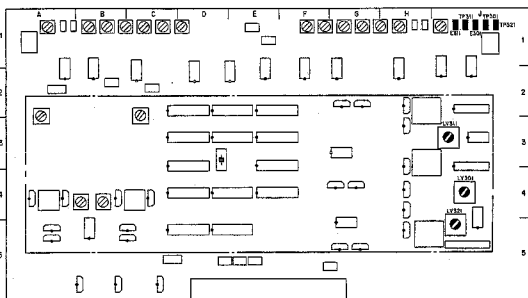
## 11-6. ERASE ADJUSTMENT

### 11-6-1. AU/TC Erase Tune Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1/2; No signal</li> <li>REC mode</li> <li>Blank tape</li> </ul>	<p>Step 1</p> <p>TP311 / AR-14 (H-2) GND : E311 (J-1) ● LV311 / AR-14 (J-3)</p> <p>Spec. level → maximize</p>
	<p>Step 2</p> <p>TP311 / AR-14 (H-2) GND : E311 (J-1) TP301 / AR-14 (H-3) GND : E301 (J-1) ● LV301 / AR-14 (C-2)</p> <p>Oscilloscope ; X-Y mode</p>  <p>phase difference between TP311 and TP301 Spec. <math>A \leq 0 \pm 10^\circ</math> (1 DIV.)</p>
	<p>Step 3</p> <p>TP311 / AR-14 (H-2) TP321 / AR-14 (H-5) GND : E311 (J-1) ● LV321 / AR-14 (C-2)</p> <p>Oscilloscope ; X-Y mode</p>  <p>phase difference between TP311 and TP321 Spec. <math>A \leq 0 \pm 10^\circ</math> (1 DIV.)</p>

Conditions for adjustment	Adjustment point • Specifications						
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1 / 2 ;</li> <li>No signal</li> <li>REC mode</li> <li>Blank tape</li> </ul>	<p>Step 4</p> <table> <tr> <td>CH-1</td><td>CH-2</td></tr> <tr> <td>TP301 / AR-14 (J-1)</td><td>TP311 / AR-14 (J-1)</td></tr> <tr> <td>GND : E301 (J-1)</td><td>GND : E311 (J-1)</td></tr> </table> <p>TC</p> <p>TP321 / AR-14 (J-1)</p> <p>GND : E311 (J-1)</p> <p>Spec. <math>150 \pm 15</math> mV rms</p>	CH-1	CH-2	TP301 / AR-14 (J-1)	TP311 / AR-14 (J-1)	GND : E301 (J-1)	GND : E311 (J-1)
CH-1	CH-2						
TP301 / AR-14 (J-1)	TP311 / AR-14 (J-1)						
GND : E301 (J-1)	GND : E311 (J-1)						

AR-14 BOARD (A side)



## SECTION 12 VIDEO SYSTEM ALIGNMENT

### [EQUIPMENT]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
  - Signal Generator
    - Component SG (TEKTRONIX TSG-300 / TSG-131A op. 03 or equivalent)
    - Composite SG (TEKTRONIX TSG-131A op. 03 / 1411 or equivalent)
    - Y / C (TEKTRONIX TSG-131A op. 03 or equivalent)
  - Waveform Monitor (WFM)
    - Component (TEKTRONIX WFM300 / 300A / 1781 / 1765 op. SC or equivalent)
    - Composite (TEKTRONIX 1751 / 1781 / 1765 op. SC or equivalent)
  - Spectrum Analyzer (ADVANTEST R4131 B / D or equivalent)
  - Sweep Generator (SHIBASOKU VS-12CX or equivalent)
  - Picture Monitor
  - Deviation Checker (SONY EW-580)
  - Frequency Counter
  - Current Probe (TEKTRONIX P6022 or equivalent)
  - Blank Tape (metal) BCT-20MA or equivalent
- Note :** "Blank Tape" indicates a cassette tape on which no video / audio signals are recorded.
- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)

### Contents

TIME min. s	VIDEO TRACK	AFM
0 : 00	RF Sweep	No-Signal
2 : 00	Marker 1, 2, 4, 6, 8, 10, 12 MHz	
	60 % H-Sweep (CTDM)	
5 : 00	Marker 0.5, 1, 2, 3, 4, 5 MHz	
	Pulse & Bar (CTDM)	
8 : 00	60 % Multi Burst	
	Y : 0.5, 1, 2, 4, 5, 5.5 MHz	400 Hz Sine Wave 25 kHz Deviation 75 kHz Deviation
	C : 0.2, 0.5, 1, 1.5, 2 MHz	
11 : 00	Pulse & Bar	
14 : 00		
16 : 30	100 % Color Bars	
17 : 00		
	50 % Bowtie & 10T	No-Signal
19 : 00		
	Line 17A Signal	
22 : 00		
	Quad Phase	
24 : 00		
	50 % Flat Field	No-Signal
26 : 00		
	100 % Color Bars with Dropout	
28 : 00		
30 : 00	Composite H-Sweep with VISC	

## [SWITCH / SETUP MENU SETTING]

This setting should be changed in position unless otherwise specified.

### <Sub Control Panel>

INPUT SELECT : COMPOSITE  
REMOTE / LOCAL : LOCAL  
CTL / LTC / U-BIT : LTC  
CHARACTER : ON  
TC INPUT EXT / INT : INT

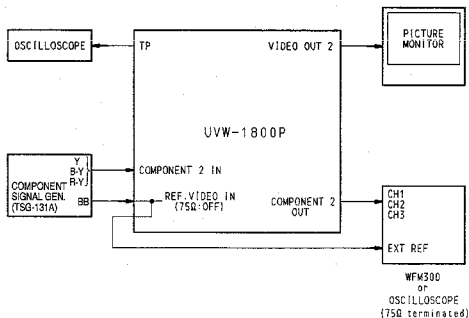
### <Connector Panel>

Component 1 / 2 : 2

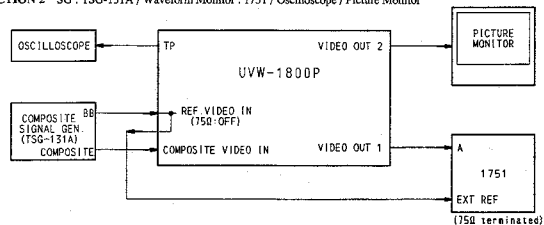
## [CONNECTION]

Connect some equipment as following unless otherwise specified.

CONNECTION 1 SG : TSG-131A / Waveform Monitor : WFM-300 / Oscilloscope / Picture Monitor



**CONNECTION 2** SG : TSG-131A / Waveform Monitor : 1751 / Oscilloscope / Picture Monitor



**[PREPARATIONS AND NOTES ON ALIGNMENT]**

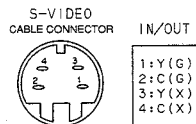
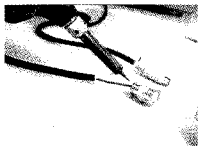
Making the cable for measuring S-VIDEO input / output level.

S-terminal (Y / C) convert cable (BNC×2) is necessary to measuring S-VIDEO input / output level.

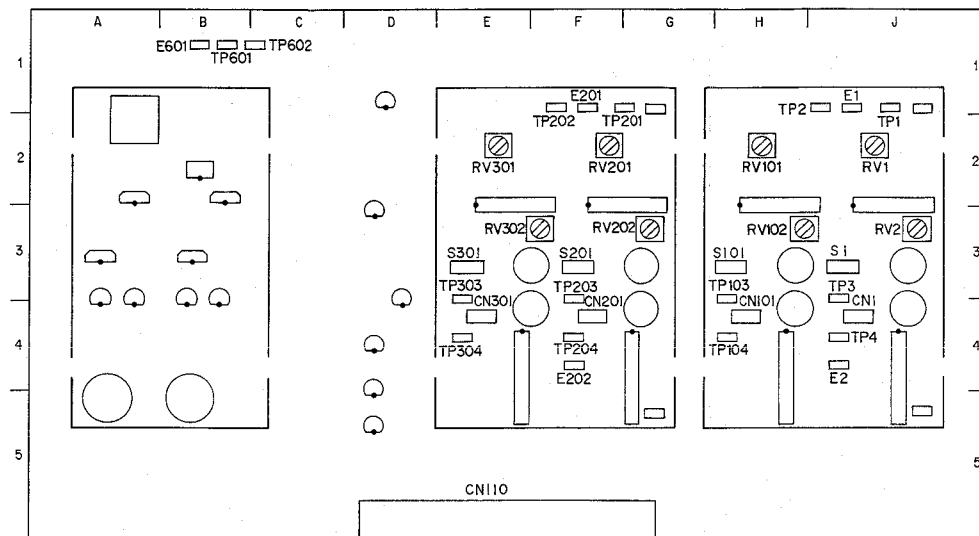
Preparation : S-S terminal connection cable about 5 meters in length (standard product) (SONY YC-50KV)



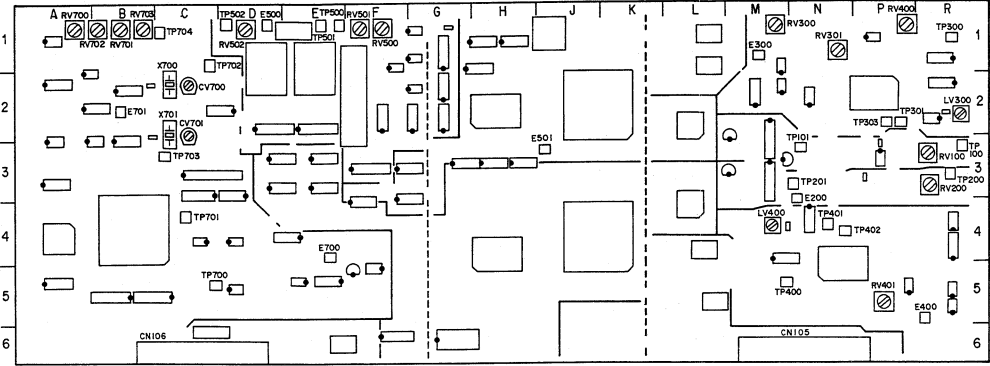
1. Cut the cable in half.
2. Tear and strip the cover of the cable with a cutter.
3. Strip the cover of the shield wire with a nipper.
4. Check the Y / C core wire with a tester.
5. Solder the BNC terminal for Y signal to the shield wire of Y signal in the cable and the BNC terminal for C signal to the shield wire of C signal.  
(Check the continuity with a tester.)



RP-70 board (A side)

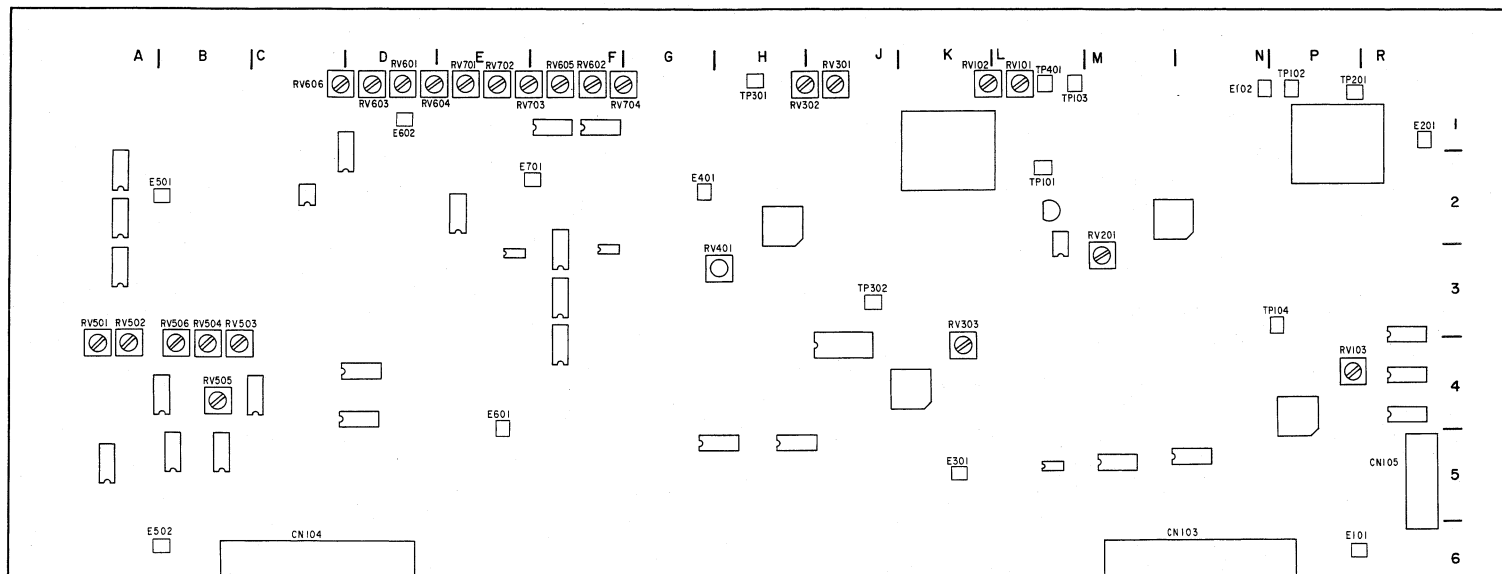


TBC-25 board (A side)

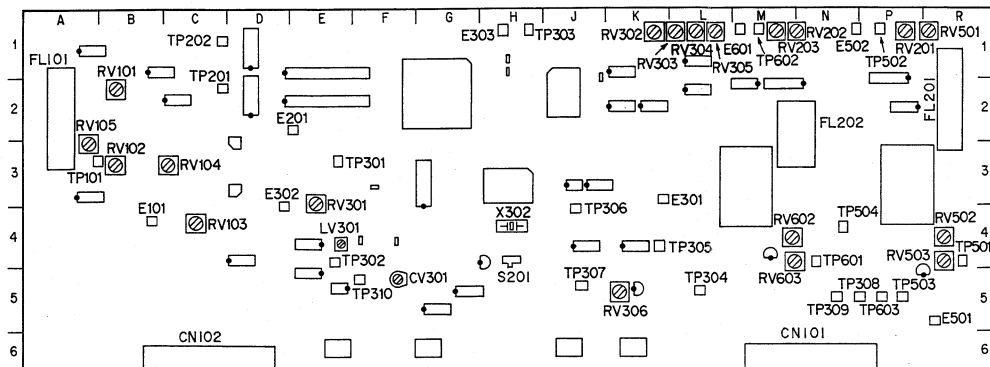




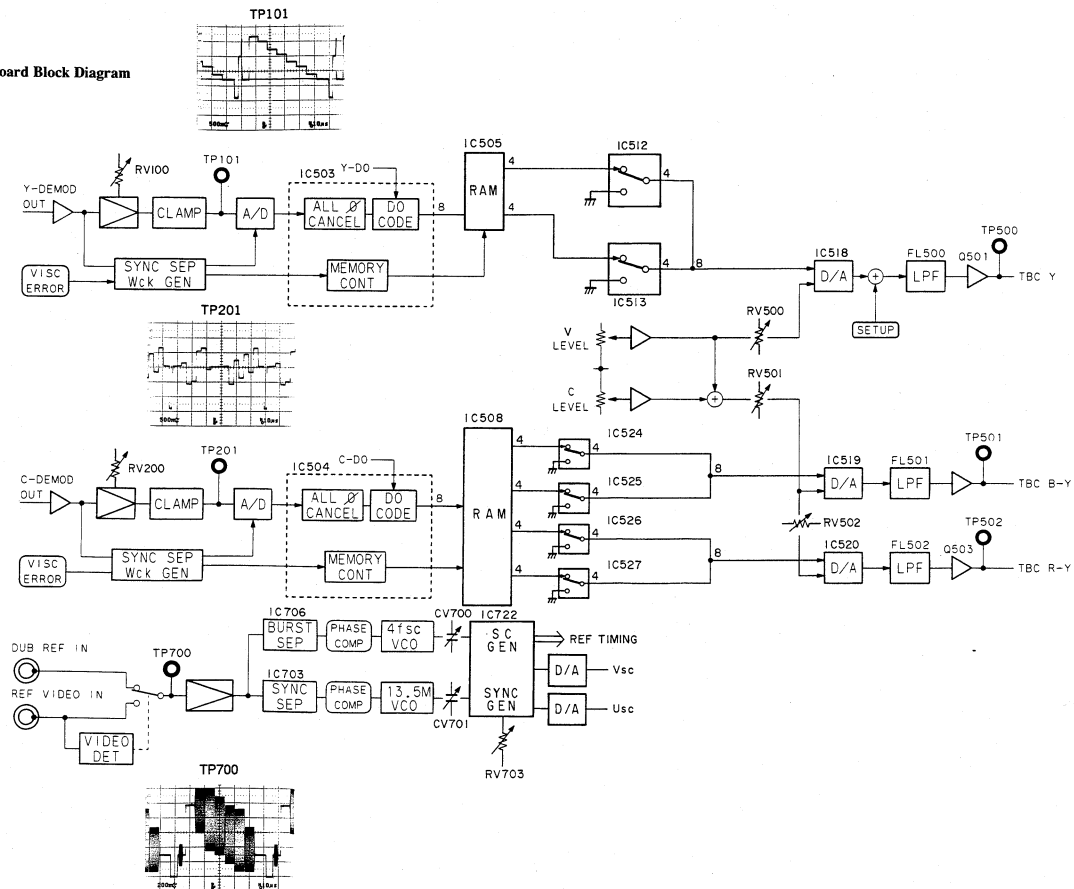
VP-43 board (A side)



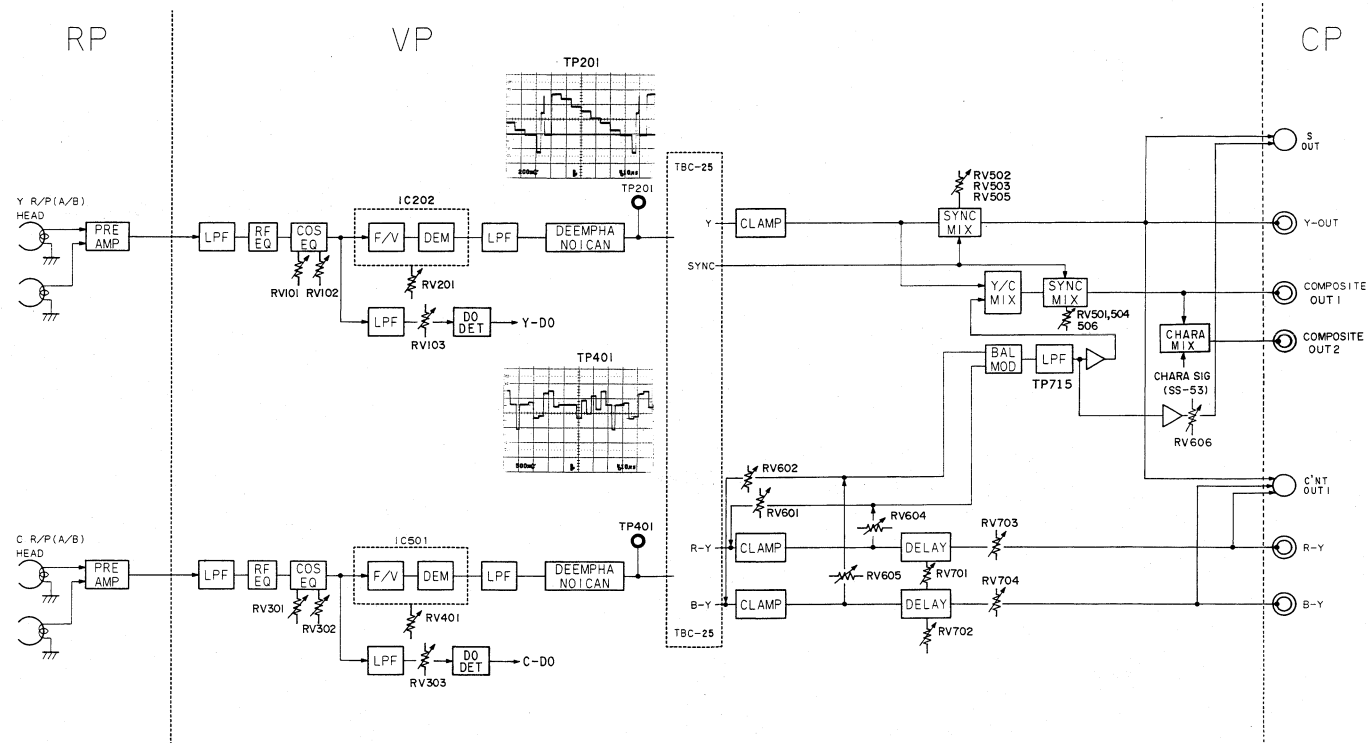
VRA-5 board (A side)



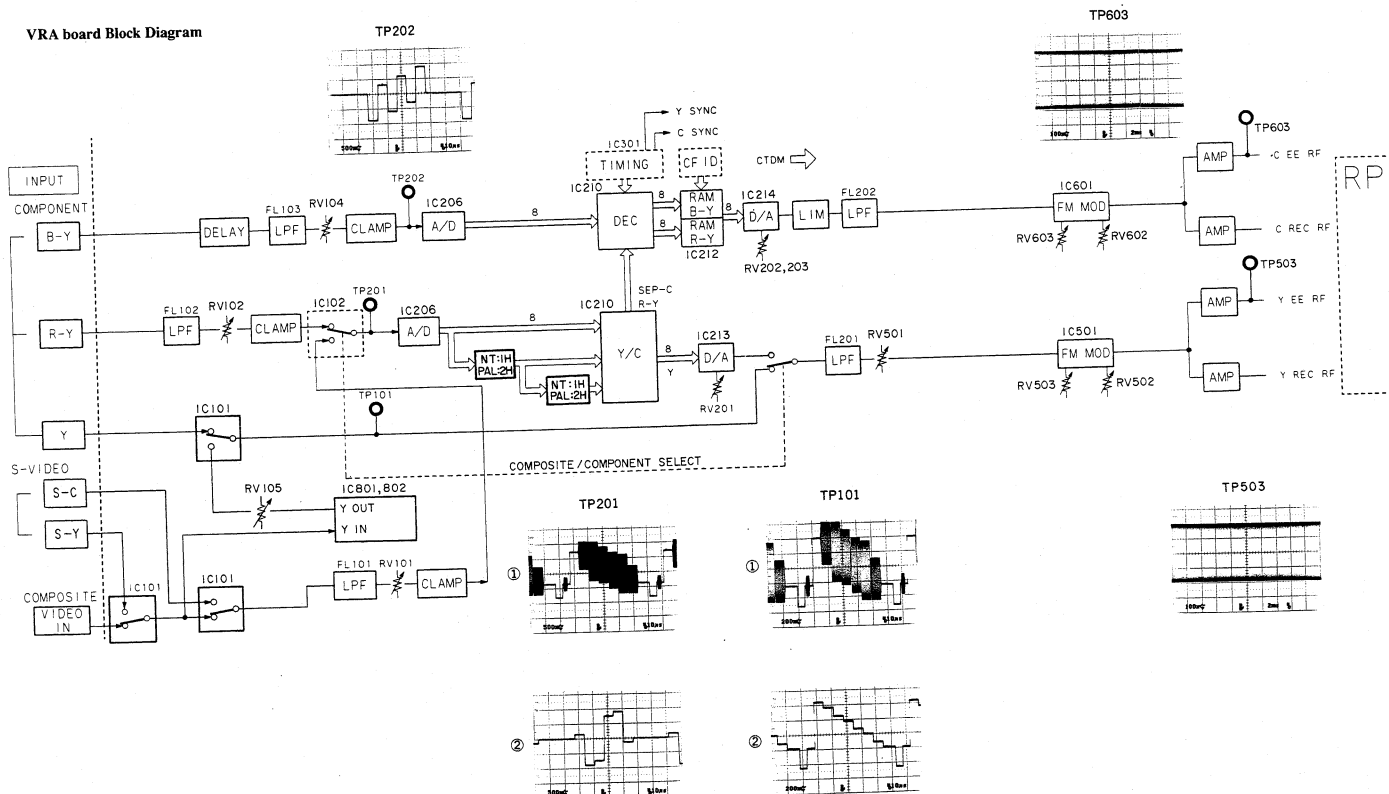
TBC board Block Diagram



# VP board Block Diagram



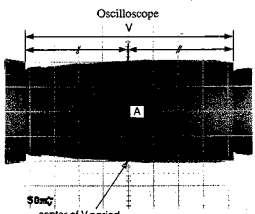
### VRA board Block Diagram



REC system  
Input : 100 % color bars (PAL)  
          75 % color bars (NTSC)  
① : Composite signal input only  
② : Component signal input only  
no marking : ① and ②

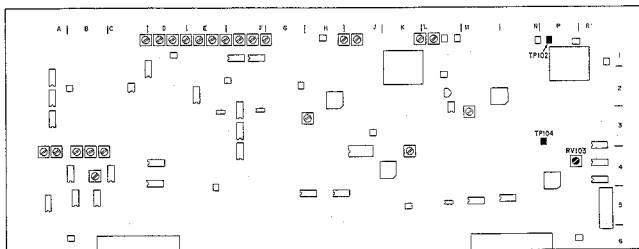
## 12-1. VP BOARD (RF, DM SYSTEM) ADJUSTMENT

### 12-1-1. Y PB RF Level Adjustment

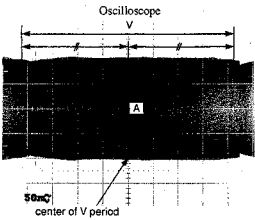
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode flat field / CR5-1B PS (24:00 - 26:00)</li> </ul>	<p>TP104 / VP-43 (P-3)  <b>● RV103 / VP-43 (P-4)</b></p> <p>TRIG : TP102 / VP-43 (P-1)</p>  <p>Spec. <math>A = 0.20 \pm 0.01 \text{ V}</math></p>

CONNECTION 1

VP-43 board (A side)

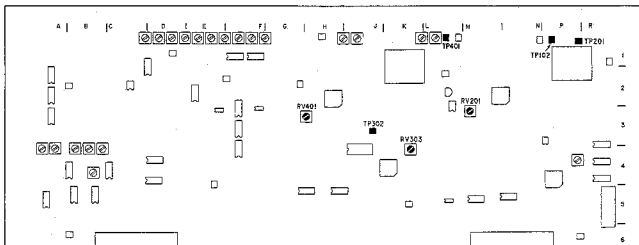


## 12-1-2. C PB RF Level Adjustment

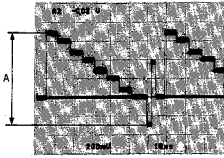
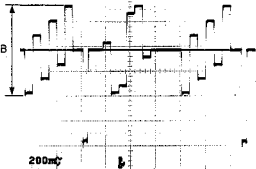
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode</li> <li>flat field / CR5-1B PS</li> <li>(24:00 - 26:00)</li> </ul>	<p>TP302 / VP-43 (J-3)            ● RV303 / VP-43 (K-4)</p> <p>TRIG : TP102 / VP-43 (P-1)</p>  <p>50mV center of V period Spec. A = 0.20 ± 0.01 V</p>

CONNECTION 1

VP-43 board (A side)




### 12-1-3. Y and C Demodulator Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode</li> <li>100 % color bar / CR5-1B PS</li> <li>(14 : 00 – 17 : 00)</li> </ul>	<p>(A) Y DM GAIN TP201 / VP-43 (P-1) ⊗ RV201 / VP-43 (M-3)</p> <p>TRIG : TP201 / VP-43 (P-1)</p> <p>Oscilloscope</p>  <p>Spec. <math>A = 0.80 \pm 0.02 \text{ Vp-p}</math></p>
	<p>(B) C DM GAIN TP401 / VP-43 (L-1) ⊗ RV401 / VP-43 (H-3)</p> <p>TRIG : TP401 / VP-43 (L-1)</p> <p>Oscilloscope</p>  <p>Spec. <math>A = 0.933 \pm 0.02 \text{ V}</math></p>

CONNECTION 1



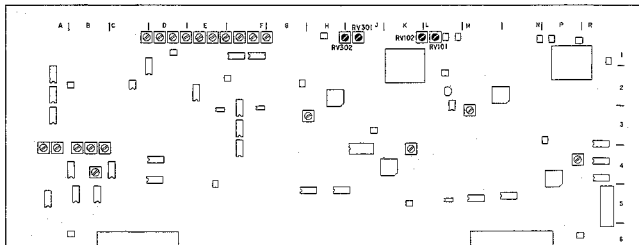
#### 12-1-4. PB Y Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• PB mode</li> </ul> Multi burst signal / CR5-1B PS (8 : 00 ~ 11 : 00)	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="327 331 478 369"> <p>Ach</p> <p>● RV101 / VP-43 (L-1)</p> </div> <div data-bbox="607 331 761 369"> <p>Bch</p> <p>● RV102 / VP-43 (K-1)</p> </div> </div> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p> 

### 12-1-5. PB C Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>Multi burst signal / CR5-1B PS (8 : 00 - 11 : 00)</li> </ul>	<p><b>COMPONENT 2 R-Y / B-Y OUT (75 Ω terminated)</b></p> <p>Ach                      Bch</p> <p>● RV301 / VP-43 (J-1)          ● RV302 / VP-43 (H-1)</p> <p style="text-align: center;"><b>TRIG : REF. VIDEO</b></p> <p style="text-align: center;"><b>WFM or Oscilloscope</b></p> <p style="text-align: center;">Spec. (1) R-Y</p> <ol style="list-style-type: none"> <li>8T BAR reference 100 % (or 0 dB)</li> <li>1.0 MHz = 97 % (99 thru 94 %) (<math>-0.3 \pm 0.2</math> dB)</li> <li>(2) Check the levels for following frequencies.</li> <li>0.2 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)</li> <li>0.5 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)</li> <li>1.5 MHz = 87 % (93 thru 78 %) (<math>-1.2 \pm 0.6</math> dB)</li> <li>(3) Check that the waveform of B-Y satisfies the specifications above. When specification is not satisfied, perform fine adjustments so that both waveforms of R-Y and B-Y satisfy the specification.</li> </ol>

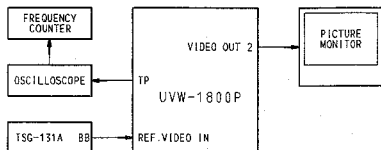
**VP-43 board (A side)**



## 12-2. TBC BOARD ADJUSTMENT

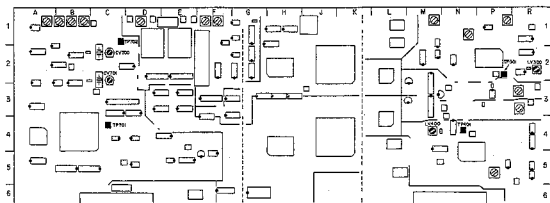
### 12-2-1. INT SC Frequency Adjustment

[CONNECTION]

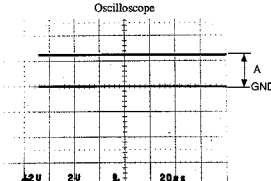


Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>EE mode</li> <li>REF. VIDEO INPUT; No signal</li> </ul>	<p>TP701 / TBC-25 (C-4)</p> <p>TRIG : TP701 / TBC-25 (C-4)</p> <p>Oscilloscope</p> <p>Spec. <math>A = 5.0 \pm 0.3</math> V</p> <hr/> <p>4FSC FREQ  TP701 / TBC-25 (C-4)  CV700 / TBC-25 (C-2)</p> <p>Frequency counter</p> <p>Spec. <math>f = 4,433,618 \pm 10</math> Hz</p>

TBC-25 board (A side)

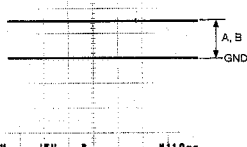


### 12-2-2. HCK Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> </ul>	<p>TP702 / TBC-25 (C-1)  <math>\odot</math> CV701 / TBC-25 (C-2)</p> <p>Oscilloscope</p>  <p>Spec. <math>A = +2.50 \pm 0.05</math> Vdc</p>

CONNECTION 1

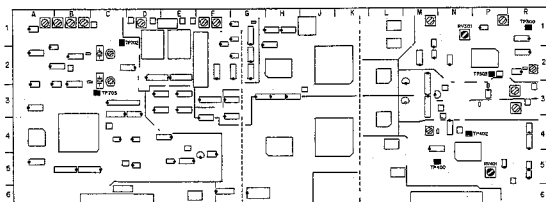
### 12-2-3. Y and C Normal VCO Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode</li> <li>100 % color bar / CR5-1B PS</li> <li>(14:00 - 17:00)</li> </ul>	<p>(A) Y ERR VOLT  TP301 / TBC-25 (P-2)  <math>\odot</math> LV300 / TBC-25 (R-2)</p> <p>(B) C ERR VOLT  TP401 / TBC-25 (N-4)  <math>\odot</math> LV400 / TBC-25 (M-4)</p> <p>Oscilloscope</p>  <p>Spec. <math>A = B = +2.80 \pm 0.05</math> Vdc</p>

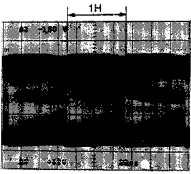
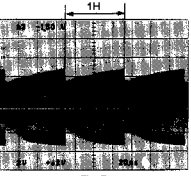
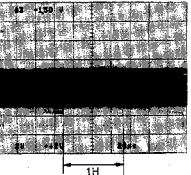
CONNECTION 1

TBC-25 board (A side)

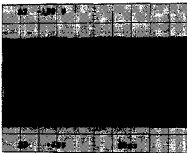
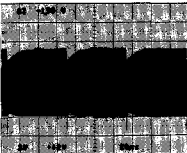

APPLICATION : 12-2-4.



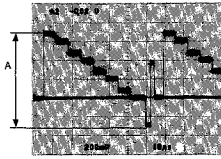
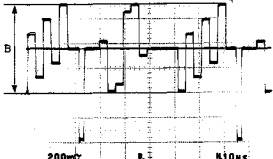
## 12-2-4. Y and C WCK Frequency Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT ; 100 % color bar</li> <li>• REF. VIDEO INPUT ; Black burst</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> </ul>	<p><b>Y WCK</b></p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>(A) Phase adjustment</p> <p>CH-1 : TP703 / TBC-25 (C-3)</p> <p>CH-2 : TP303 / TBC-25 (P-2)</p> <p>● SYNC control / Sub control panel</p> </div> <div style="width: 45%;"> <p>(B) Frequency adjustment</p> <p>CH-1 : TP703 / TBC-25 (C-3)</p> <p>CH-2 : TP303 / TBC-25 (P-2)</p> <p>● RV301 / TBC-25 (N-1)</p> </div> </div> <p style="text-align: center;">TRIG : TP300 / TBC-25 (R-1)</p>
	<p style="text-align: center;">Oscilloscope</p> <p style="text-align: center;">CH-1 and CH-2 (INVERT) ADD waveform</p> <div style="text-align: center;">  <p>Fig. A</p> <p>↓ (A)</p>  <p>Fig. B</p> <p>↓ (B)</p>  <p>Fig. C</p> </div> <p>Spec. (A) Make smaller the amplitude and let appear several lateral stripes clearly, as shown in the progress to Fig. B from Fig. A, by the SYNC control on the sub control panel.</p> <p>(B) Equalize the frequency of CH-2 to CH-1 with RV301 as shown in Fig. C. (When the lateral stripes become straight lines, the both frequencies are equal.)</p>

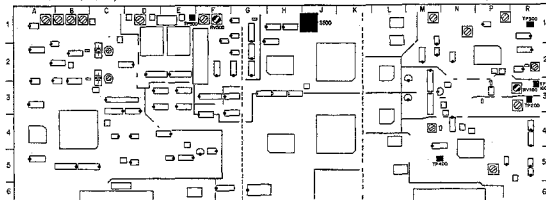
CONNECTION 1

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT ; 100 % color bar</li> <li>• REF. VIDEO INPUT ; Black burst</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> </ul>	<p>C WCK</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>(A) Phase adjustment</p> <p>CH-1 : TP703 / TBC-25 (C-3)</p> <p>CH-2 : TP402 / TBC-25 (N-4)</p> <p>⊗ SYNC control / Sub control panel</p> </div> <div style="width: 45%;"> <p>(B) Frequency adjustment</p> <p>CH-1 : TP703 / TBC-25 (C-3)</p> <p>CH-2 : TP402 / TBC-25 (N-4)</p> <p>⊗ RV401 / TBC-25 (P-5)</p> </div> </div> <p style="text-align: center;">TRIG : TP400 / TBC-25 (M-5)</p> <p style="text-align: center;">Oscilloscope</p> <p style="text-align: center;">CH-1 and CH-2 (INVERT) ADD waveform</p> <div style="text-align: center;">  <p>Fig. A</p> <p>↓ (A)</p>  <p>Fig. B</p> <p>↓ (B)</p>  <p>Fig. C</p> </div> <p>Spec. (A) Make smaller the amplitude and let appear several lateral stripes clearly, as shown in the progress to Fig. B from Fig. A, by the SYNC control on the sub control panel.</p> <p>(B) Equalize the frequency of CH-2 to CH-1 with RV401 as shown in Fig. C. (When the lateral stripes become straight lines, the both frequencies are equal.)</p>

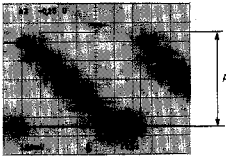

## 12-2-5. Y and C TBC Input Level Check

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode</li> <li>100 % color bar / CR5-1B PS</li> <li>(14 : 00 – 17 : 00)</li> </ul>	<p>(A) Y IN TP100 / TBC-25 (R-3)</p> <p>TRIG : TP300 / TBC-25 (R-1)</p> <p>Oscilloscope</p>  <p>Spec. <math>A = 0.8 \pm 0.1 \text{ Vp-p}</math></p>
	<p>(B) C IN TP200 / TBC-25 (R-3)</p> <p>TRIG : TP400 / TBC-25 (M-5)</p> <p>Oscilloscope</p>  <p>Spec. <math>A = 0.933 \pm 0.1 \text{ V}</math></p>

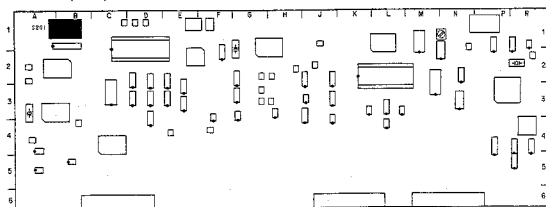
TBC-25 board (A side)



## 12-2-6. Y TBC Output and Gain Adjustment

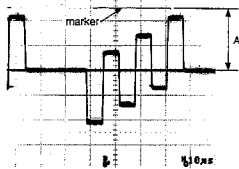
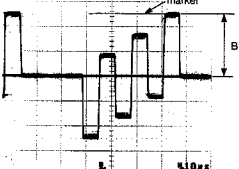
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode 100 % color bar / CRS-1B PS (14:00 - 17:00)</li> <li>• S201-1 (MAINTENANCE MODE) / SS-53 (B-1); CLOSE (ON)</li> <li>• S500-1 (LEVEL REF) / TBC-25 (J-1); CLOSE (ON)</li> </ul> <p>• After adjustment is completed, set S201-1 / SS-53 and S500-1 / TBC-25 to OFF.</p> <p>CONNECTION 1</p>	<p>Step 1</p> <p>(A) VIDEO LEVEL TP500 / TBC-25 (E-1) ● RV500 / TBC-25 (F-1)</p> <p>TRIG : VIDEO OUT</p> <p>Oscilloscope</p>  <p>Spec. <math>A = 0.50 \pm 0.01</math> Vp-p</p>
	<p>Step 2</p> <p>(B) Y GAIN TP500 / TBC-25 (E-1) ● RV100 / TBC-25 (R-3)</p> <p>TRIG : VIDEO OUT</p> <p>Oscilloscope</p>  <p>Spec. Set the B level to marker (Ref. <math>B = 0.50 \pm 0.01</math> Vp-p)</p>

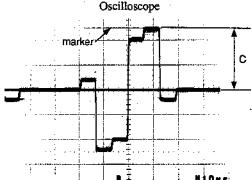
SS-53 board (A side)



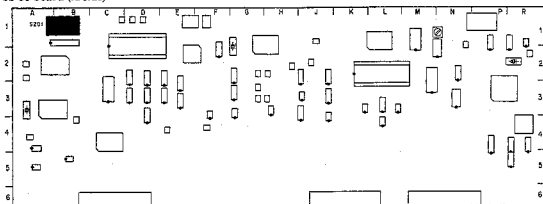


## 12-2-7. C TBC Output and Gain Adjustment

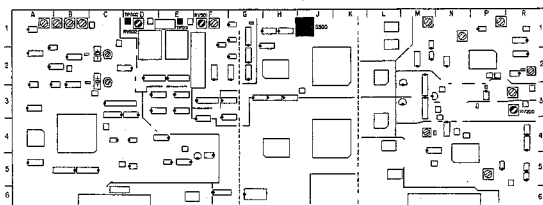
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode</li> <li>100 % color bar / CR5-1B PS (14 : 00 – 17 : 00)</li> <li>• S201-1 (MAINTENANCE MODE) / SS-53 (B-1) ; CLOSE (ON)</li> <li>• S500-1 (LEVEL REF) / TBC-25 (J-1) ; CLOSE (ON)</li> </ul>	<p>Step 1</p> <p>(A) CHROMA LEVEL TP501 / TBC-25 (E-1) ⊙ RV501 / TBC-25 (F-1)</p> <p>TRIG : VIDEO OUT</p> <p>Oscilloscope</p>  <p>Spec. <math>A = 0.333 \pm 0.01 \text{ V}</math></p>
<p>CONNECTION 1</p>	<p>Step 2</p> <p>(B) C GAIN TP501 / TBC-25 (E-1) ⊙ RV200 / TBC-25 (R-3)</p> <p>TRIG : VIDEO OUT</p> <p>Oscilloscope</p>  <p>Spec. Set the B level to marker (Ref. <math>B = 0.333 \pm 0.01 \text{ V}</math>)</p>

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode 100 % color bar / CR5-1B PS (14 : 00 – 17 : 00)</li> <li>• S201-1 (MAINTENANCE MODE) / SS-53 (B-1) ; CLOSE (ON)</li> <li>• S500-1 (LEVEL REF) / TBC-25 (J-1) ; CLOSE (ON)</li> </ul> <p>• After adjustment is completed, set S201-1 / SS-53 and S500-1 / TBC-25 to OFF.</p> <p>CONNECTION 1</p>	<p>Step 3</p> <p>(C) CHROMA LEVEL TP502 / TBC-25 (D-1) RV502 / TBC-25 (D-1)</p> <p>TRIG : VIDEO OUT</p> <p>Oscilloscope</p>  <p>Spec. <math>C = 0.333 \pm 0.01 \text{ V}</math></p>

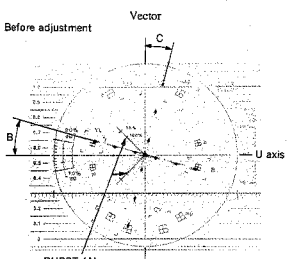
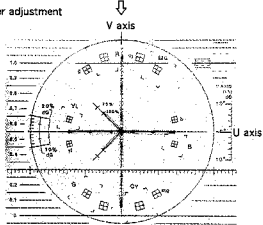
SS-53 board (A side)



TBC-25 board (A side)

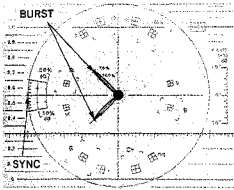


# 12-2-8. U-V Axis Phase (B-Y, R-Y Phase) Adjustment

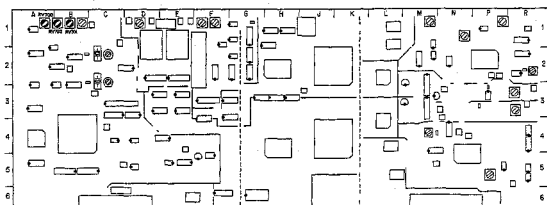
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> </ul> QUAD PHASE / CR5-1B PS (22:00 - 24:00)	VIDEO OUT 1 (75 $\Omega$ terminated) (A) Burst ● PHASE control / Vector (B) U axis (HUE) ● RV702 / TBC-25 (B-1) (C) V axis (U / V OFFSET) ● RV700 / TBC-25 (A-1)
	TRIG : REF. VIDEO <div style="text-align: center;"> <p>Before adjustment</p>  <p>After adjustment</p>  </div> <p>Spec. (A) Set the dot of the burst on the right position on the scale.            (B) Set the dots of the B-Y on the U axis of the vector.  <math>B = 0 \pm 1^\circ</math>            (C) Set the dots of the R-Y on the V axis of the vector.  <math>C = 0 \pm 1^\circ</math></p>

CONNECTION 2

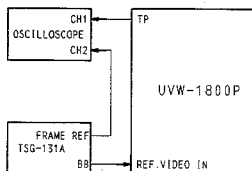
# 12-2-9. SCH Phase Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar (CR5-1B PS) (14:00 - 17:00)</li> <li>REF. VIDEO INPUT; No signal</li> <li>Use the Waveform Vector (1751) on SC-H mode.</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) Burst Adjustment ● PHASE control / Vector</p> <p>(B) INT SC ● RV701 / TBC-25 (B-1)</p> <p>TRIG : INT / WFM</p> <p>SC-H mode</p>  <p>After adjustment is completed, connect the REF. VIDEO INPUT connector.</p> <p>CONNECTION 2</p> <p>Spec. (A) Set the dot of the burst on the normal position on the scale.</p> <p>(B) The SYNC should be in the center of the burst (SCH = 0°)</p>



TBC-25 board (A side)



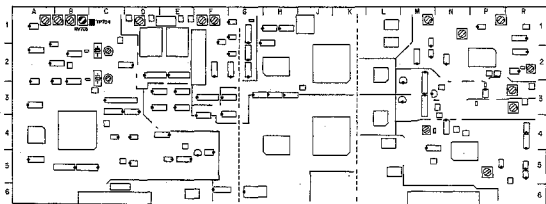
**12-2-10. Reference CF Phase Adjustment**  
[CONNECTION]



Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>EE mode</li> </ul>	<p>CH-1 TP704 / TBC-25 (C-1) ● RV703 / TBC-25 (B-1)</p> <p>CH-2 FIELD PULSE / TSG-131A</p> <p>TRIG : FIELD PULSE (CH-2)</p> <p>Oscilloscope</p> <p>(NG)</p> <p>CH-2</p> <p>CH-1</p> <p>↓</p> <p>(OK)</p> <p>CH-2</p> <p>CH-1</p>

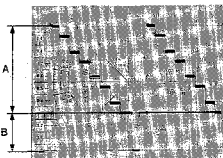
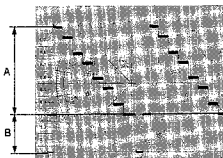
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> </ul>	<p>Spec. (1) Turn RV703 counterclockwise fully.</p> <p>(2) When RV703 is turned clockwise gradually, the phase condition between CH-1 and CH-2 changes from NG to OK or OK to NG.</p> <p>(3) In case of the pattern of change is started from NG as shown in the following illustration, set RV703 to mechanical center of range of first OK.</p> <p>NG → OK → NG → OK      this point</p> <p>↑</p> <p>the mechanical center of this range</p>  <p>RV703</p> <p>(4) In case of the pattern of change is started from OK as shown in the following illustration, set RV703 to mechanical center of range of first OK.</p> <p>OK → NG → OK → NG      this point</p> <p>↑</p> <p>the mechanical center of this range</p>  <p>RV703</p> <p>* If the range of first OK is extremely narrow, set to mechanical center of range of second OK.</p>

TBC-25 board (A side)



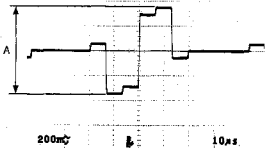

## 12-3. VP BOARD (VO, EN) ADJUSTMENT

### 12-3-1. Component 2 and 1 Y OUT Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode</li> <li>100 % color bar / CR5-1B PS (14 : 00 - 17 : 00)</li> </ul>	<p>Step 1</p> <p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>(A) Y GAIN <span style="margin-left: 100px;">(B) Y SYNC</span></p> <p>⊗ RV503 / VP-43 (B-4) <span style="margin-left: 100px;">⊗ RV502 / VP-43 (A-4)</span></p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.014 \text{ V}</math>  <math>B = 0.300 \pm 0.007 \text{ V}</math></p>
	<p>Step 2 (Check)</p> <p>COMPONENT 1 (Y) OUT (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.020 \text{ V}</math>  <math>B = 0.300 \pm 0.01 \text{ V}</math></p>

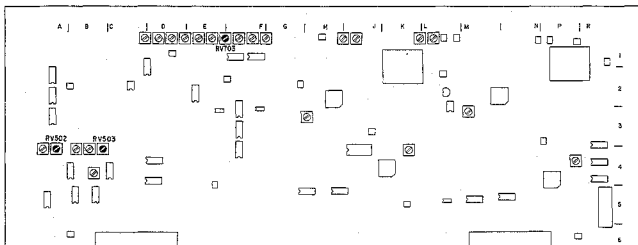
CONNECTION 1

# 12-3-2. Component 2 and 1 R-Y OUT Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>PB mode</li> <li>100 % color bar / CR5-1B PS</li> <li>(14:00 - 17:00)</li> </ul>	<p>Step 1</p> <p>COMPONENT 2 R-Y OUT (75 <math>\Omega</math> terminated)</p> <p>RV703 / VP-43 (E-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.014</math> Vp-p</p>
	<p>Step 2 (Check)</p> <p>COMPONENT 1 (R-Y) OUT (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.014</math> Vp-p</p>

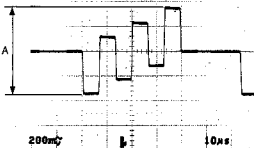

CONNECTION 1

VP-43 board (A side)



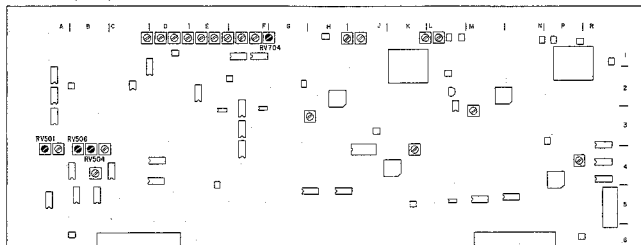


### 12-3.3. Component 2 and 1 B-Y OUT Level Adjustment

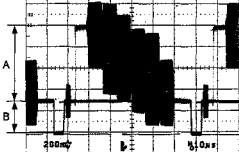
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14 : 00 – 17 : 00)</li> </ul>	<p>Step 1</p> <p>COMPONENT 2 B-Y OUT (75 <math>\Omega</math> terminated)</p> <p>RV704 / VP-43 (G-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.014</math> Vp-p</p>
	<p>Step 2 (Check)</p> <p>COMPONENT 1 (B-Y) OUT (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.014</math> Vp-p</p>

CONNECTION 1

VP-43 board (A side)

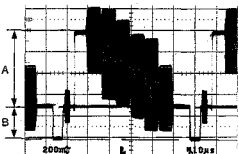


### 12-3-4. VIDEO OUT 1 Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode</li> <li>100 % color bar / CR5-1B PS</li> <li>(14 : 00 -- 17 : 00)</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) VIDEO 1  <math>\bullet</math> RV504 / VP-43 (B-4)</p> <p>(B) VIDEO SYNC  <math>\bullet</math> RV501 / VP-43 (A-4)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. A = <math>0.700 \pm 0.014</math> V          B = <math>0.300 \pm 0.007</math> V</p>

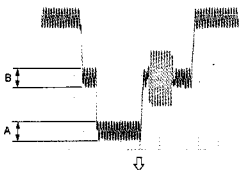
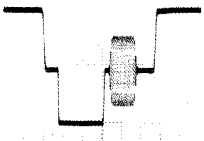
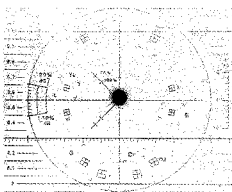
CONNECTION 2

### 12-3-5. VIDEO OUT 2 Y Level Adjustment

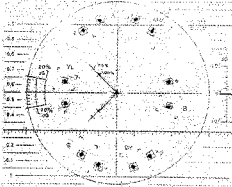
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode</li> <li>100 % color bar / CR5-1B PS</li> <li>(14 : 00 -- 17 : 00)</li> </ul>	<p>VIDEO OUT 2 (75 <math>\Omega</math> terminated)</p> <p>(A) VIDEO 2  <math>\bullet</math> RV506 / VP-43 (B-4)</p> <p>(B) VIDEO SYNC          Check</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. A = <math>0.700 \pm 0.014</math> V          B = <math>0.300 \pm 0.014</math> V</p>

CONNECTION 2

# 12-3-6. VIDEO OUT 1 ENC SC Leak Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode Flat field / CR5-1B PS (24:00 – 26:00)</li> <li>Use the Waveform Vector (1751) on WFM mode.</li> <li>Set the time axis of the WFM to magnification mode.</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) U SC LEAK RV602 / VP-43 (F-1)</p> <p>(B) V SC LEAK RV601 / VP-43 (D-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM mode</p> <p>Before adjustment</p>  <p>After adjustment</p>  <p>Spec. Minimize the A. (<math>A \leq 0.01</math> V) Minimize the B. (<math>B \leq 0.01</math> V) Adjust alternately.</p>
<p>CONNECTION 2</p>	
<p>Step 2</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode Flat field / CR5-1B PS (24:00 – 26:00)</li> <li>Use the Waveform Vector (1751) on VECTOR mode.</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>VECTOR mode</p>  <p>Spec. Maximum the gain of the Vector and check the dot is at center.</p>
<p>CONNECTION 2</p>	

### 12-3-7. VIDEO OUT 1 C Level Adjustment

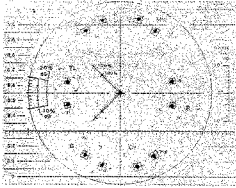
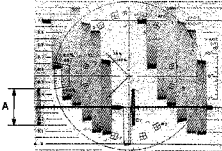
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14:00 - 17:00)</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) Burst            ● PHASE control / Vector</p> <p>(B) V axis (ENC R-Y)            ● RV604 / VP-43 (D-1)</p> <p>(C) U axis (ENC B-Y)            ● RV605 / VP-43 (F-1)</p> <p>TRIG : REF, VIDEO</p>  <p>Spec. (A) Set the dot of the burst on the right position on the scale. All dots should be inside the "田" mark on the vector by adjustment RV604 and RV605 alternately.</p>

CONNECTION 2

### 12-3-8. VIDEO OUT Burst Level Adjustment

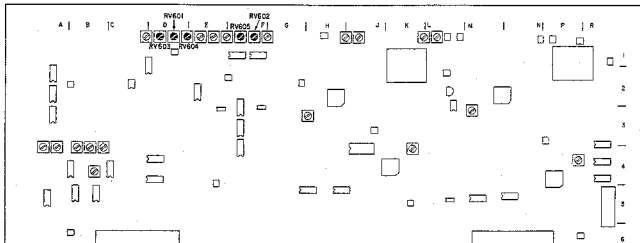
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode 100 % color bar / CR5-1B PS (14 : 00 – 17 : 00)</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>● RV603 / VP-43 (D-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p> <p>200mc</p> <p>2us</p> <p>Spec. <math>A = 0.300 \pm 0.007</math> V</p>

# 12-3-9. VIDEO OUT 2 C Level and Burst Level Check

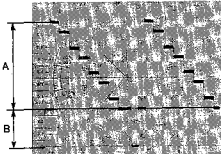
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>PB mode</li> <li>100 % color bar / CRS-1B PS (14:00 – 17:00)</li> </ul> <p>Step 1</p> <ul style="list-style-type: none"> <li>Use the Waveform Vector (1751) as a vectorscope, set the dot of the burst on the right position on the scale by PHASE control.</li> </ul>	<p>VIDEO OUT 2 (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>VECTOR mode</p> 
CONNECTION 2	Spec. All dots should be inside the "□" mark on the Vector.
<p>Step 2</p> <ul style="list-style-type: none"> <li>Use the Waveform Vector (1751) on WFM mode.</li> </ul>	<p>VIDEO OUT 2 (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM mode</p> 
CONNECTION 2	Spec. $A = 0.300 \pm 0.01 V$

VP-43 board (A side)

APPLICATION : 12-3-6 to 8.

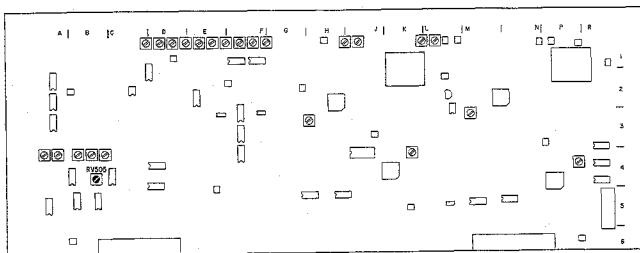


# 12-3-10. S-VIDEO OUT Y Level Adjustment

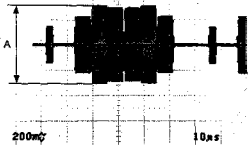
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14 : 00 ~ 17 : 00)</li> </ul>	<p>S-VIDEO (Y) OUT</p> <p>(A) S / Y LEVEL  RV505 / VP-43 (B-4)</p> <p>(B) S-SYNC Check</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. A = <math>0.700 \pm 0.014</math> V  B = <math>0.300 \pm 0.014</math> V</p>

CONNECTION 1

VP-43 board (A side)

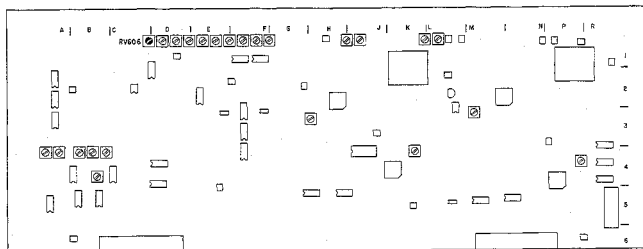


# 12-3-11. PB S-VIDEO C Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14 : 00 - 17 : 00)</li> </ul>	<p>S-VIDEO (C) OUT (75 <math>\Omega</math> terminated)</p> <p>● RV606 / VP-43 (C-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.885 \pm 0.01</math> Vp-p</p>

CONNECTION 2

VP-43 board (A side)

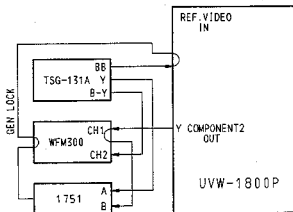


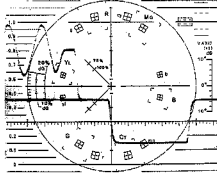
#### 12-4. PB VIDEO PHASE, Y / C DELAY ADJUSTMENT (VP-43 BOARD, TBC-25 BOARD)

**Note :** Perform the adjustment order to 12-4-1, 12-4-2, 12-4-3.

### 12-4-1. PB VIDEO Phase Adjustment

**[CONNECTION for Step 1 to 3]**

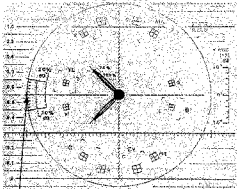
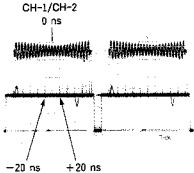


Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>50 % BOWTIE &amp; 10T / CR5-1B PS (17 : 00 – 19 : 00)</li> <li>COMPONENT 2 INPUT ; 50 % BOWTIE</li> <li>Set the following setting Waveform Vector (1751).</li> </ul> <p>WFM mode</p> <p>SWEEP : 1 <math>\mu</math>s (2H / MAG)</p> <p>FILTER : FLAT</p> <p>EXT REF : EXT</p> <p>GAIN : <math>\times 1</math></p>	<p>CH-A                      CH-B</p> <p><input checked="" type="radio"/> HORIZ POS control / Vector                      <input checked="" type="radio"/> SYNC control / Sub control panel</p> <p>TRIG : EXT / WFM</p> <p>WFM mode</p>  <p>Spec. Set the SYNC falling point to the center.</p>

Continues to the next page.



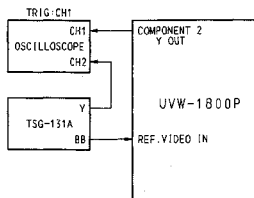
# 12-4-1. PB Video Phase Adjustment (Continued)

Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>50 % BOWTIE &amp; 10T / CR5-1B PS (17 : 00 – 19 : 00)</li> <li>COMPONENT 2 INPUT ; 50 % BOWTIE</li> <li>Use the Waveform Vector (1751) on SC-H mode.</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>● SYNC control / Sub control panel</p> <p>TRIG : EXT / WFM</p> <p>SC-H mode</p>  <p>SYNC CH-A → CH-B</p> <p>Spec. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with the SYNC control on the sub control panel. (Note : The dot position should be adjust in the direction of the shortest movement.)</p>
<p>Step 3</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>50 % BOWTIE &amp; 10T / CR5-1B PS (17 : 00 – 19 : 00)</li> <li>INPUT SELECT switch / Sub control panel ; Y-R, B</li> <li>WFM300 ; BOWTIE mode (WFM)</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>● RV300 / TBC-25 (M-1)</p> <p>TRIG : EXT / WFM</p> <p>WFM</p>  <p>CH-1/CH-2 0 ns -20 ns +20 ns</p> <p>Spec. Set the BOWTIE DIP points (cross points of the CH-1 and CH-2) on the center marker. <math>0 \pm 20 \text{ nsec}</math></p>

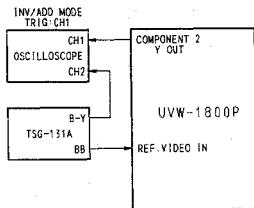
**[Reference]**

If not prepare the WFM300/1751, connect the oscilloscope following figure and adjust Step 1 and 3.

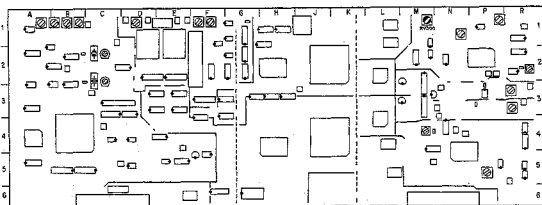
**[CONNECTION for Step 1]**



**[CONNECTION for Step 3]**

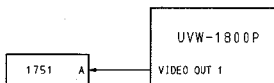


**TBC-25 board (A side)**



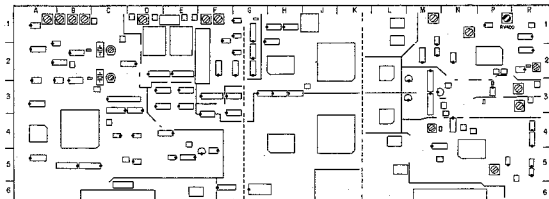
## 12-4-2. PB Composite Y / C Delay Adjustment

[CONNECTION]



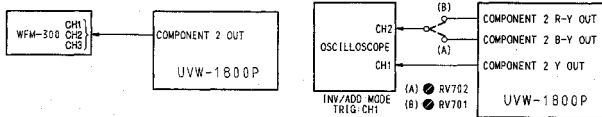
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>Line 17A / CR5-1B PS</li> <li>(19:00 - 22:00)</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>● RV400 / TBC-25 (P-1)</p> <p>TRIG : INT / WFM</p> <p>WFM Before adjustment</p> <p>10T portion</p> <p>Minimize</p> <p>↓</p> <p>After adjustment</p> <p>Spec. Flat</p>

TBC-25 board (A side)



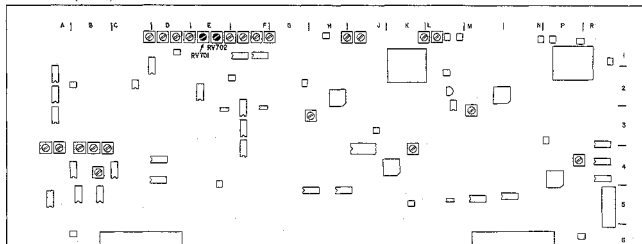
### 12-4.3. PB Component Y / C Delay Adjustment

#### [CONNECTION]



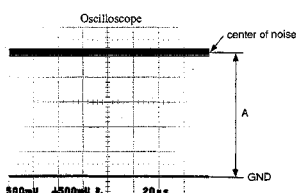
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>50 % BOWTIE &amp; 10T / CR5-1B PS (17:00 ~ 19:00)</li> <li>WFM300; BOWTIE mode. (WFM)</li> </ul>	<p>COMPONENT 2 OUT (75 <math>\Omega</math> terminated)</p> <p>(A) B-Y DELAY  <math>\odot</math> RV702 / VP-43 (E-1)</p> <p>(B) R-Y DELAY  <math>\odot</math> RV701 / VP-43 (E-1)</p> <p>TRIG: EXT / WFM</p> <p>WFM</p> <p>Spec. Set the each BOWTIE DIP point of (A) and (B) on the center marker.</p> <p><math>0 \pm 20</math> nsec</p>

#### VP-43 board (A side)

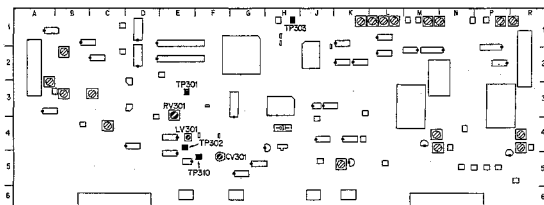


## 12-5. VRA BOARD ADJUSTMENT

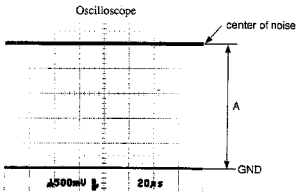
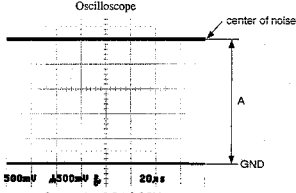
### 12-5-1. COMPONENT H Lock Loop

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> </ul> <p>CONNECTION 1</p>	<p>TP302 / VRA-5 (E-4)            Ⓞ LV301 / VRA-5 (E-4)</p>  <p>Oscilloscope</p> <p>center of noise</p> <p>A</p> <p>GND</p> <p>500mV 1500mV 20μs</p> <p>Spec. <math>A = 2.5 \pm 0.1 \text{ Vdc}</math></p>

VRA-5 board (A Side)

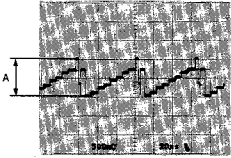


## 12-5-2. COMPOSITE 4 Fsc Lock Loop DC Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• VIDEO INPUT; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel; COMPOSITE</li> </ul>	<p>TP310 / VRA-5 (F-5)  <b>⊗ CV301 / VRA-5 (F-5)</b></p>  <p>Spec. <math>A = 2.0 \pm 0.1 \text{ Vdc}</math></p>
	<p>TP301 / VRA-5 (E-3)  <b>⊗ RV301 / VRA-5 (E-3)</b></p>  <p>Spec. <math>A = 2.5 \pm 0.1 \text{ Vdc}</math></p>

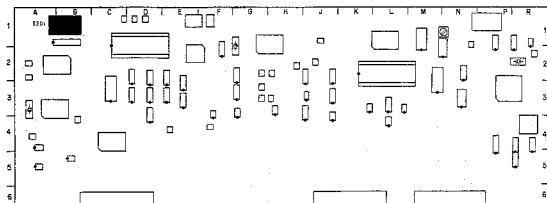
CONNECTION 2

### 12-5-3. COMPONENT Y Level Adjustment

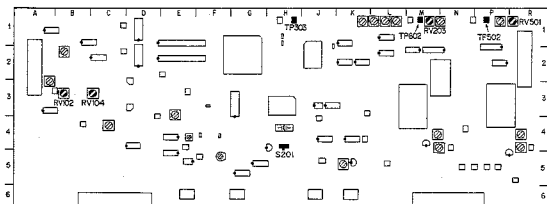
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> </ul>	<p>TP502 / VRA-5 (P-1)  <math>\odot</math> RV501 / VRA-5 (R-1)</p> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p>  <p>Spec. <math>A = 1.00 \pm 0.01</math> Vp-p</p>

CONNECTION 1

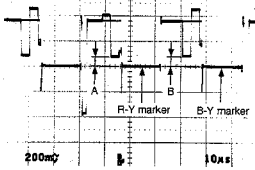
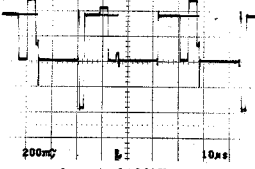
SS-53 board (A Side)



VRA-5 board (A Side)




# 12-5-4. COMPONENT A / D R-Y, B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel; Y-R, B</li> <li>• S201-1 (MAINTENANCE MODE) / SS-53 (B-1); CLOSE (ON)</li> <li>• S201 (AD LEVEL REF) / VRA-5 (H-4); CLOSE (ON)</li> </ul>	<p>(A) A / D R-Y TP602 / VRA-5 (M-1) RV102 / VRA-5 (B-3)</p> <p>(B) A / D B-Y TP602 / VRA-5 (M-1) RV104 / VRA-5 (C-3)</p> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope Before adjustment</p>  <p>200mV 10μs</p> <p>After adjustment</p>  <p>200mV 10μs</p> <p>Spec. A = <math>0 \pm 0.01</math> V B = <math>0 \pm 0.01</math> V</p>

CONNECTION 1


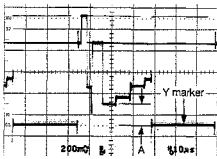
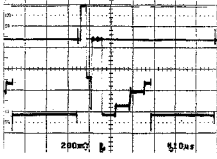
# 12-5-5. COMPONENT D / A R-Y, B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel; Y-R, B</li> </ul>	<p>TP602 / VRA-5 (M-1) RV203 / VRA-5 (M-1)</p> <p>Oscilloscope</p>  <p>10μs</p> <p>Spec. A = <math>0.933 \pm 0.01</math> V</p>

CONNECTION 1


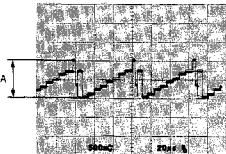


## 12-5-6. COMPOSITE A / D Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• VIDEO INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> <li>• S201-1 (MAINTENANCE MODE) / SS-53 (B-1) ; CLOSE (ON)</li> <li>• S201 (AD LEVEL REF) / VRA-5 (H-4) ; CLOSE (ON)</li> </ul>	<p>TP502 / VRA-5 (P-1)   RV101 / VRA-5 (B-2)</p> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p> <p>before adjustment</p>  <p>after adjustment</p>  <p>Spec. <math>A = 0 \pm 0.01 \text{ V}_{p-p}</math></p>


CONNECTION 2

## 12-5-7. COMPOSITE D / A Y Level Adjustment

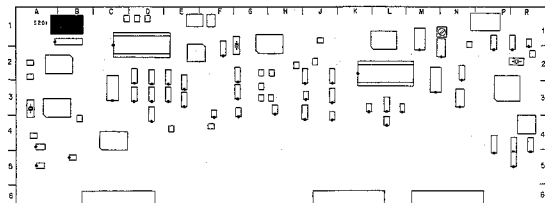
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• VIDEO INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> </ul>	<p>TP502 / VRA-5 (P-1)   RV201 / VRA-5 (P-1)</p> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p>  <p>Spec. <math>A = 1.00 \pm 0.01 \text{ V}_{p-p}</math></p>

CONNECTION 2

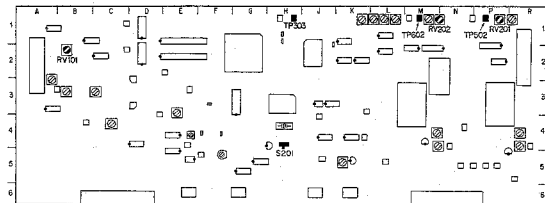
### 12-5-8. COMPOSITE D / A C Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• VIDEO INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> </ul>	<p>TP602 / VRA-5 (M-1)  <b>○ RV202 / VRA-5 (N-1)</b></p> <p>TRIG : TP602 / VRA-5 (M-1)</p> <p>Oscilloscope</p>  <p>Spec. A = <math>0.933 \pm 0.01</math> V</p>

### SS-53 board (A Side)

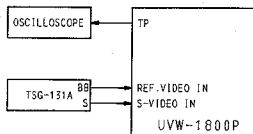


### VRA-5 board (A Side)



## 12-5-9. S-VIDEO Y Level Adjustment

[CONNECTION]

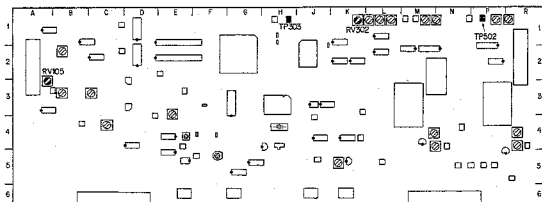


Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• S-VIDEO INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; S-VIDEO</li> </ul>	<p>TP502 / VRA-5 (P-1)  <b>● RV105 / VRA-5 (A-2)</b></p> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p> <p>Spec. <math>A = 1.00 \pm 0.01 \text{ Vp-p}</math></p>

# 12-5-10. Y REF SYNC Timing and Pulse Width Adjustment

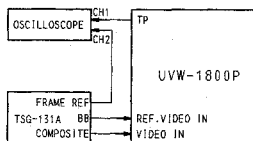
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> </ul>	<div> <div> (A) Timing TP502 / VRA-5 (P-1) RV302 / VRA-5 (K-1) </div> <div> (B) Pulse Width Check </div> </div> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p> <p>Note : Final adjustment of RV302 is performed at overall video phase adjustment (Section 12-7), so it may change the value of A.</p> <p>CONNECTION 1</p> <p>Spec. <math>A = 2.65 \pm 0.05 \mu s</math>  <math>B = 5.0 \pm 0.1 \mu s</math></p>

VRA-5 board (A Side)

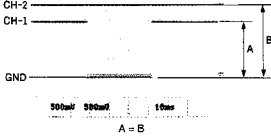
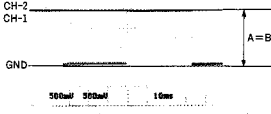


# 12-5-11. COMPOSITE SCH Detect Circuit Adjustment

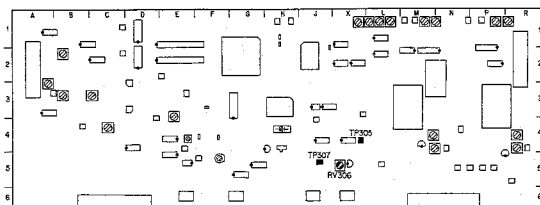
[CONNECTION for Step 1, 2]



Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• EE mode</li> <li>• VIDEO INPUT ; 100 % color bar (SCH = 0°)</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> </ul>	<p>(A) Check</p> <p>CH-1 : TP305 / VRA-5 (K-4)</p> <p>CH-2 : FRAME PULSE / TSG-131A</p> <p>TRIG : CH-1</p> <p>Oscilloscope</p> <p>Spec. <math>A = 1.5 \pm 0.5 \text{ Vdc}</math></p>

Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> <li>• EE mode</li> <li>• VIDEO INPUT ; 100 % color bar (SCH = 0°)</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> </ul>	<p>(B) SCH CH-1 : TP305 / VRA-5 (K-4) CH-2 : TP307 / VRA-5 (J-5) ● RV306 / VRA-5 (K-5)</p> <p>TRIG : CH-1</p> <p>Oscilloscope</p> <p>Before adjustment</p>  <p>↓</p> <p>After adjustment</p>  <p>Spec. <math>A - B = 0 \pm 0.05 \text{ Vdc}</math></p>

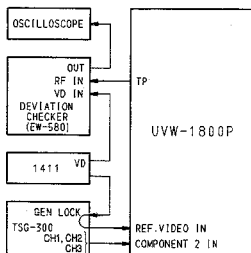
VRA-5 board (A Side)



## 12-5-12. Y Deviation Adjustment

(1) Adjusting procedure using a deviation checker.

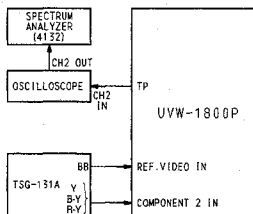
[CONNECTION]



Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel; Y-R, B</li> <li>• Set the switches of the deviation checker following. NTSC / PAL : PAL METAL / OXIDE : METAL Y / C : Y</li> <li>• Connect the TP503 / VRA-5 (P-5) to RF IN / deviation checker.</li> </ul>	<p>EW-580 / OUT</p> <p>(A) Y CARRIER ● RV503 / VRA-5 (R-4)</p> <p>(B) Y DEVIATION ● RV502 / VRA-5 (R-4)</p> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p> <p>B portion WHITE peak level</p> <p>Spec. (A) Pedestal and A portion should be in line. (B) B portion and the WHITE peak level, C portion and the SYNC TIP level should be in line.</p>

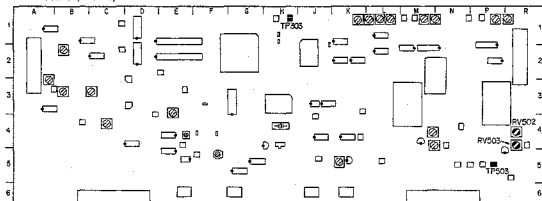
(2) Adjusting procedure using a spectrum analyzer.

[CONNECTION]



Conditions for adjustment	Adjustment point • Specifications	
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT; Pulse &amp; bar</li> <li>• INPUT SELECT switch / Sub control panel; Y-R, B</li> </ul>	(A) Y CARRIER TP503 / VRA-5 (P-5) ● RV503 / VRA-5 (R-4)	(B) Y DEVIATION TP503 / VRA-5 (P-5) ● RV502 / VRA-5 (R-4)
	<p>Spectrum analyzer</p> <p>Spec. (A) The center peak level should be 7.4 MHz. (B) The interval between the two peak levels (7.4 MHz and 8.8 MHz) should be 1.4 MHz.</p>	

VRA-5 board (A Side)

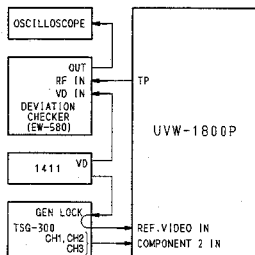




## 12-5-13. C Deviation Adjustment

(1) Adjusting procedure using a deviation checker.

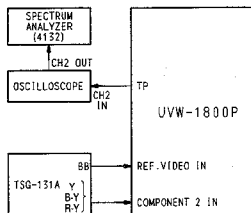
[CONNECTION]



Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT : 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> <li>• Set the switches of the deviation checker following.  NTSC / PAL : PAL  METAL / OXIDE : METAL  Y / C : C</li> <li>• Connect the TP603 / VRA-5 (P-5) to RF IN / deviation checker.</li> </ul>	<p>EW-580 / OUT</p> <p>(A) C CARRIER  ⊙ RV603 / VRA-5 (M-4)</p> <p>(B) C DEVIATION  ⊙ RV602 / VRA-5 (M-4)</p> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p> <p>Spec. (A) Pedestal and A portion should be in line.  (B) B portion and the high level, C portion and the low level should be in line.</p>

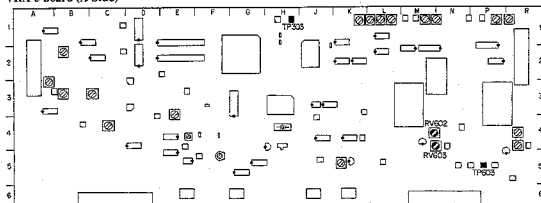
(2) Adjusting procedure using a spectrum analyzer.

[CONNECTION]



Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel; Y-R, B</li> </ul>	<div style="display: flex; justify-content: space-between;"> <div>(A) C CARRIER TP603 / VRA-5 (P-5) RV603 / VRA-5 (M-4)</div> <div>(B) C DEVIATION TP603 / VRA-5 (P-5) RV602 / VRA-5 (M-4)</div> </div> <p style="text-align: center;">TRIG : TP303 / VRA-5 (H-1)</p> <p style="text-align: center;">Spectrum analyzer</p> <p style="text-align: center;">Spec. (A) The center peak level should be 6.1 MHz. (B) The interval between the two peak levels (5.43 MHz and 6.78 MHz) should be 1.33 MHz.</p>

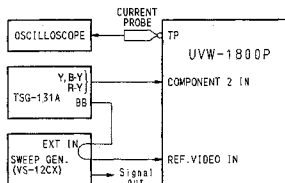
VRA-5 board (A Side)



## 12-6. RP BOARD ADJUSTMENT

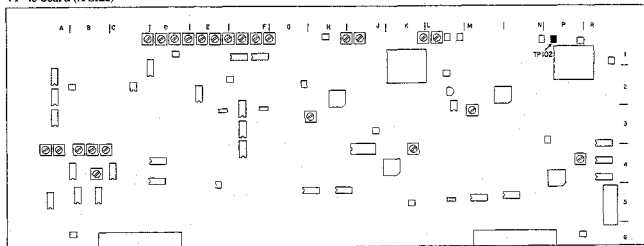
### 12-6-1. Y REC Current Adjustment

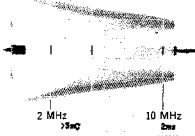
[CONNECTION for Step 1, 2]



Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• EE mode</li> <li>• Connect TP1-E1 / RP-70 (J-1) (J-1) with a shorting clip.</li> <li>• Connect the HOT side of a sweep generator output to TP2 / RP-70 (J-1) and the GND side to TP1 (J-1).</li> </ul>	<p>TP2 / RP-70 (J-1)</p> <p>● Level control / sweep generator</p> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p> <p>Spec. <math>A = 0.40 \pm 0.02</math> Vp-p at 5 MHz</p>

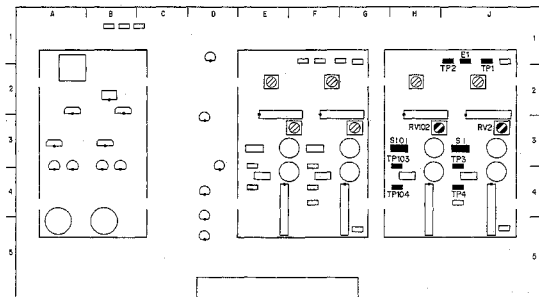
VP-43 board (A Side)



Conditions for adjustment	Adjustment point • Specifications	
<b>Step 2</b> <ul style="list-style-type: none"> <li>S1, S101 / RP-70 (J-3) (H-3); OPEN (OFF)</li> <li>Short TP3-TP4 / RP-70 (J-3) (J-4) and TP103-TP104 / RP-70 (H-3) (H-4) with shorting clip and measure with current probe.</li> <li>Supply the sweep signal from the sweep generator connected between TP2-TP1 / RP-70 (J-1) (J-1).</li> <li>REC mode</li> <li>Blank tape</li> </ul> <ul style="list-style-type: none"> <li>After adjustment is completed, remove the shorting clip connected between TP1-E1 and sweep signal input.</li> </ul>	<b>YA</b> TP3-TP4 / RP-70 (J-3) (J-4) <b>RV2</b> / RP-70 (J-3)	<b>YB</b> TP103-TP104 / RP-70 (H-3) (H-4) <b>RV102</b> / RP-70 (H-3)
	TRIG : TP102 / VP-43 (P-1)  Oscilloscope   Spec. 2 MHz reference (100 %), 10 MHz = $65 \pm 10\%$	

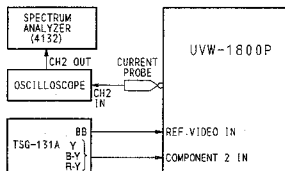
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RP-70 board (A Side)

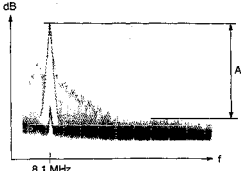


# 12-6-1. Y REC Current Adjustment (Continued)

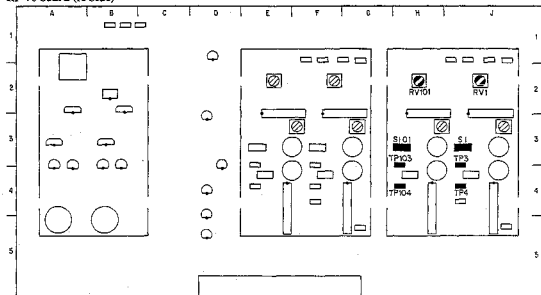
[CONNECTION for Step 3, 4]



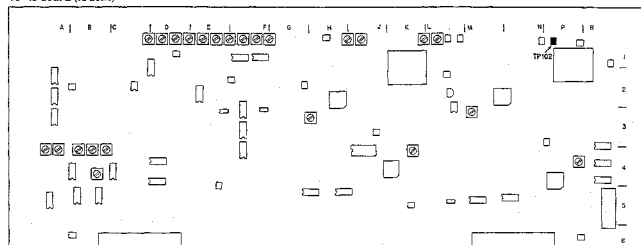
Conditions for adjustment	Adjustment point • Specifications
<p>Step 3</p> <ul style="list-style-type: none"> <li>• COMPONENT 2 INPUT ; 50 % flat field</li> <li>• INPUT SELECT switch (sub control panel) ; Y-R, B</li> <li>• REC mode</li> <li>Blank tape</li> </ul>	<p>YA TP3-TP4 / RP-70 (J-3) (J-4)  <b>RV1</b> / RP-70 (J-2)</p> <p>YB TP103-TP104 / RP-70 (H-3) (H-4)  <b>RV101</b> / RP-70 (H-2)</p> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p>  <p>20mV 2ms</p> <p>Spec. A = <math>45 \pm 10</math> mA</p>

Conditions for adjustment	Adjustment point • Specifications
<p>Step 4 (Check)</p> <ul style="list-style-type: none"> <li>• REC mode</li> <li>Blank tape</li> </ul> <p>• After adjustment is completed, remove the shorting clip and the current probe.</p> <p>• Set the S1, S101 / RP-70 to ON.</p>	<p>Oscilloscope / OUT Both YA and YB</p> <p>Spectrum analyzer</p>  <p>8.1 MHz</p> <p>Spec. <math>A \geq 35 \text{ dB}</math></p>

RP-70 board (A Side)

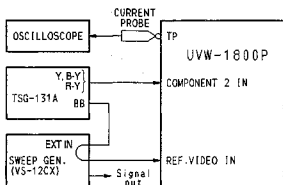


VP-43 board (A Side)



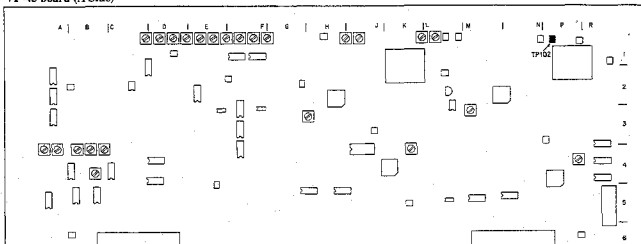
## 12-6-2. C REC Current Adjustment

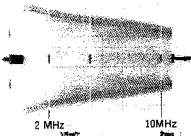
[CONNECTION for Step 1, 2]



Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• EE mode</li> <li>• Short TP201 - E201 / RP-70 (G-1) (F-1) with a short clip.</li> <li>• Connect the HOT side of a sweep generator output to TP202 / RP-70 (F-1) and the GND side to TP201 (G-1).</li> </ul>	<p>TP202 / RP-70 (F-1)</p> <p>⊗ Level control / sweep generator</p> <p>TRIG : INT</p> <p>Oscilloscope</p> <p>Spec. <math>A = 0.40 \pm 0.02</math> Vp-p at 5 MHz</p>

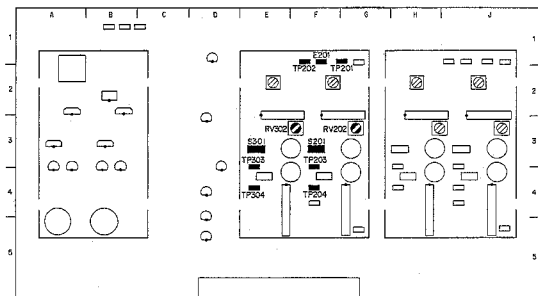
VP-43 board (A Side)



Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> <li>S201, S301 / RP-70 (F-3) (E-3) ; OPEN (OFF)</li> <li>Connect TP203 – TP204 / RP-70 (F-3) (F-4) and TP303 – TP304 / RP-70 (E-3) (E-4) with shorting clip and measure with current probe.</li> <li>Supply the sweep signal from the sweep generator connected between TP201 – TP202 / RP-70 (G-1) (F-1).</li> <li>REC mode Blank tape</li> <li>After adjustment is completed, remove the shorting clip connected between TP201-E201 and sweep signal input.</li> </ul>	<p>CA TP203-TP204 / RP-70 (F-3) (F-4)  <b>RV202 / RP-70 (G-3)</b></p> <p>CB TP303-TP304 / RP-70 (E-3) (E-4)  <b>RV302 / RP-70 (F-3)</b></p> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p>  <p>Spec. 2 MHz reference (100 %), 10 MHz = 60 ± 2 %</p>

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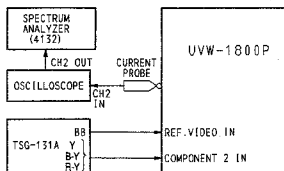
RP-70 board (A Side)





## 12-6-2. C REC Current Adjustment (Continued)

[CONNECTION for Step 3, 4]

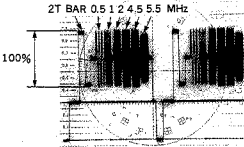
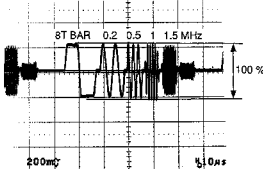


Conditions for adjustment	Adjustment point • Specifications
Step 3 • COMPONENT 2 INPUT ; 50 % flat field • INPUT SELECT switch / Sub control panel ; Y-R, B • REC mode Blank tape	<div style="display: flex; justify-content: space-between;"> <div> <b>CA</b>            TP203-TP204 / RP-70 (F-3) (F-4)            ⚙ RV201 / RP-70 (F-2)         </div> <div> <b>CB</b>            TP303-TP304 / RP-70 (E-3) (E-4)            ⚙ RV301 / RP-70 (E-2)         </div> </div> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p> <p>10mV 2ms</p> <p>Spec. A = 50 ± 10 mA</p>



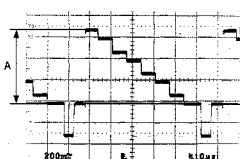
## 12-7. OVERALL CHECK AND ADJUSTMENT

### 12-7-1. COMPONENT Y and C Overall Frequency Response Check

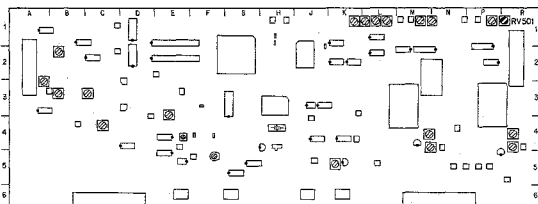
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>COMPONENT 2 INPUT; 60 % multi burst signal</li> <li>INPUT SELECT switch / Sub control panel ; Y-R, B</li> <li>Playback the recorded portion. Blank tape</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. (1) Check the levels for following frequencies.  2T BAR reference 100 % (or 0 dB)  0.5 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)  1 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)  2 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)  4 MHz = 91 % (98 thru 85 %) (<math>-0.8 \pm 0.6</math> dB)  5 MHz = 79 % (94 thru 67 %) (<math>-2 \pm 1.5</math> dB)</p> <p>(2) Check that both waveforms of CH-A and CH-B satisfied with the specification.</p> <p>(3) Flicker should not be on the monitor picture.</p> <p>(4) When specification is not satisfied, performed the "12-6-1. Y REC current adjustment Step 3" finely.</p> <p>COMPONENT 2 R-Y OUT / B-Y OUT (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. (1) Check the levels for following frequencies.  8T BAR reference 100 % (or 0 dB)  0.2 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)  0.5 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)  1 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)  1.5 MHz = 87 % (94 thru 78 %) (<math>-1.2 \pm 1.5</math> dB)</p> <p>(2) Check that both waveforms of CH-A and CH-B satisfied with the specification.</p> <p>(3) When specification is not satisfied, performed the "12-6-2. C REC current adjustment Step 3" finely.</p>

CONNECTION 1

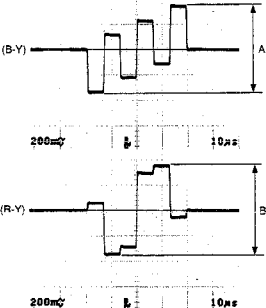
## 12-7-2. Overall Component Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>EE mode</li> <li>COMPONENT 2 INPUT ; 100 % color bar</li> <li>INPUT SELECT switch / Sub control panel ; Y-R, B</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>RV501 / VRA-5 (R-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.70 \pm 0.02</math> V</p>
<p>CONNECTION 1</p>	
<p>Step 2</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>COMPONENT 2 INPUT ; 100 % color bar</li> <li>INPUT SELECT switch / Sub control panel ; Y-R, B</li> <li>Playback the recorded portion. Blank tape</li> </ul>	<p>Spec. Satisfied the spec. referring Step 1.</p>
<p>CONNECTION 1</p>	

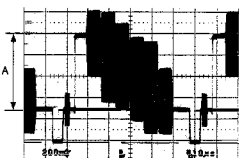
VRA-5 board (A Side)



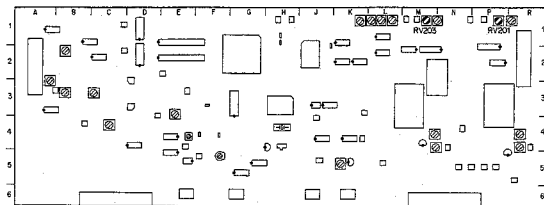
### 12-7-3. Overall Component R-Y / B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• COMPONENT 2 INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> </ul>	<p>COMPONENT 2 B-Y / R-Y OUT (75 <math>\Omega</math> terminated)</p> <p>(A) • (B) CNT-C LEVEL            Ⓞ RV203 / VRA-5 (M-I)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = B = 0.70 \pm 0.02 V_{p-p}</math></p>
<p>CONNECTION 1</p> <p>Step 2</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• COMPONENT 2 INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> <li>• Playback the recorded portion. Blank tape</li> </ul>	<p>Spec. Satisfied the spec. referring Step 1, B-Y and R-Y.</p>

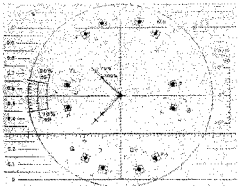
#### 12-7-4. Overall Composite Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• VIDEO INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>● RV201 / VRA-5 (P-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.70 \pm 0.02 \text{ V}</math></p>
<p>CONNECTION 2</p> <p>Step 2</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• VIDEO INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> <li>• Playback the recorded portion. Blank tape</li> </ul>	<p>Spec. Satisfied the spec. referring Step 1.</p>

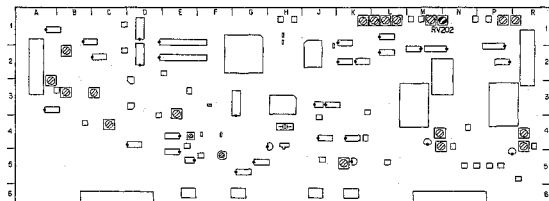
VRA-5 board (A Side)



## 12-7-5. Overall Composite C Level Adjustment

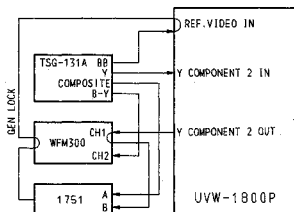
Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>EE mode</li> <li>VIDEO INPUT; 100 % color bar</li> <li>INPUT SELECT switch / Sub control panel ; COMPOSITE</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) Burst  <input checked="" type="radio"/> PHASE control / Vector</p> <p>(B) C ST-C LEVEL  <input checked="" type="radio"/> RV202 / VRA-5 (N-1)</p> <p>TRIG : REF. VIDEO</p> <p>Vector</p>  <p>Spec. (A) Set the dot of the burst on the right position on the scale.          (B) All dots should be inside the "田" mark on the vector.</p>
<p>CONNECTION 2</p> <p>Step 2</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>VIDEO INPUT; 100 % color bar</li> <li>INPUT SELECT switch / Sub control panel ; COMPOSITE</li> <li>Playback the recorded portion. Blank tape</li> </ul>	<p>Spec. Satisfied the spec. referring Step 1.</p>

VRA-5 board (A Side)



## 12-7-6. Overall Video Phase Adjustment

[CONNECTION for Step 1 to 4]

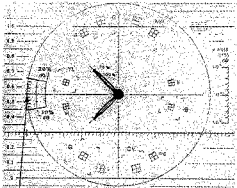


Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• COMPONENT 2 INPUT; 50 % BOWTIE</li> <li>• Set the following setting Waveform Vector (1751).</li> </ul> <p>WFM mode            SWEEP : 1 <math>\mu</math>s (2H/MAG)            FILTER : FLAT            EXT REF : EXT            GAIN : <math>\times 1</math></p>	<div style="display: flex; justify-content: space-around;"> <div> <p>CH-A</p> <p><input checked="" type="checkbox"/> HORIZ POS control / Vector</p> </div> <div> <p>CH-B</p> <p><input checked="" type="checkbox"/> SYNC control / Sub control panel</p> </div> </div> <p>TRIG : EXT / WFM</p> <p>WFM mode</p> <p>Spec. Set the SYNC falling point to the center.</p>

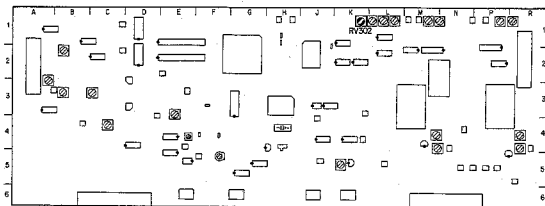
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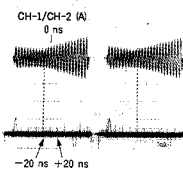
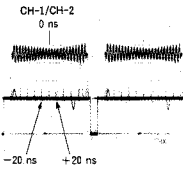


## 12-7-6. Overall Video Phase Adjustment (Continued)

Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• COMPONENT 2 INPUT ; 50 % BOWTIE</li> <li>• Use the Waveform Vector (1751) on SC-H mode.</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>● SYNC control / Sub control panel</p> <p>TRIG : EXT / WFM</p> <p>SC-H mode</p>  <p>CH-A → CH-B</p> <p>SYNC</p> <p>Spec. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with the SYNC control on the sub control panel. (Note : The dot position should be adjust in the direction of the shortest movement.)</p>

VRA-5 board (A Side)



Conditions for adjustment	Adjustment point • Specifications
<p>Step 3</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• COMPONENT 2 INPUT ; 50 % BOWTIE</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> <li>• WFM300 ; BOWTIE mode (WFM)</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>RV302 / VRA-5 (K-1)</p> <p>TRIG : EXT / WFM</p> <p>WFM</p> <p>Before adjustment</p>  <p>CH-1/CH-2 (A)</p> <p>0 ns</p> <p>-20 ns +20 ns</p> <p>↓</p> <p>After adjustment</p>  <p>CH-1/CH-2</p> <p>0 ns</p> <p>-20 ns +20 ns</p> <p>Spec. Set the BOWTIE DIP point (cross point of the CH-1 / CH-2) on the center marker.</p>
<p>Step 4</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• COMPONENT 2 INPUT ; 50 % BOWTIE</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> <li>• Playback the recorded portion. Blank tape</li> </ul>	<p>Spec. difference on BOWTIE DIP point <math>\rightarrow 0 \pm 20</math> nsec</p> <p>When specification is not satisfied <math>\rightarrow</math> Adjust Step 3 again and check that perform Step 4</p>

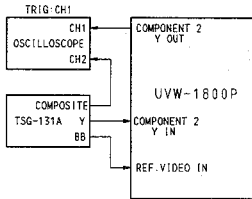
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## 12-7-6. Overall Video Phase Adjustment (Continued)

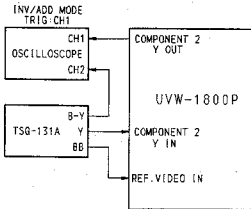
### [Reference]

If not prepare the WFM300 / 1751, connect the oscilloscope following figure and adjust Step 1, 3 and 4.

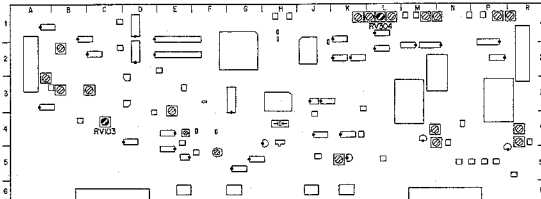
### [CONNECTION for Step 1]



### [CONNECTION for Step 3 / 4]

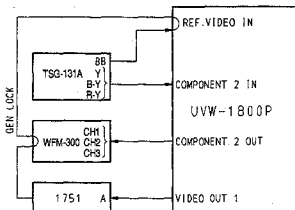


### VRA-5 board (A Side)



## 12-7-7. Overall Component Y / C Delay Adjustment

### [CONNECTION]



Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT; 50 % BOWTIE</li> <li>• INPUT SELECT switch / Sub control panel; Y-R, B</li> <li>• WFM300; BOWTIE mode (WFM)</li> </ul> <p>Note: Perform the CH-1 / CH-3 (B) adjust before the CH-1 / CH-2 (A) adjust.</p>	<p>COMPONENT 2 OUT (75 <math>\Omega</math> terminated)</p> <p>(A) C-C DELAY ⊙ RV103 / VRA-5 (C-4)</p> <p>(B) CAV Y / C DELAY ⊙ RV304 / VRA-5 (L-1)</p> <p>TRIG: EXT / WFM</p> <p>WFM</p> <p>Before adjustment</p> <p>CH-1/CH-2 (A) 0 ns</p> <p>CH-1/CH-3 (B) 0 ns</p> <p>-20 ns +20 ns -20 ns +20 ns</p> <p>↓</p> <p>After adjustment</p> <p>CH-1/CH-2 0 ns</p> <p>CH-1/CH-3 0 ns</p> <p>-20 ns +20 ns -20 ns +20 ns</p> <p>Spec. Set the each BOWTIE DIP point of (A) and (B) on the center marker. 0 <math>\pm</math> 10 nsec</p>

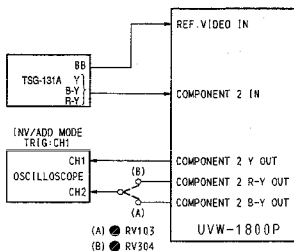
Continues to the next page.

# 12-7-7. Overall Component Y / C Delay Adjustment (Continued)

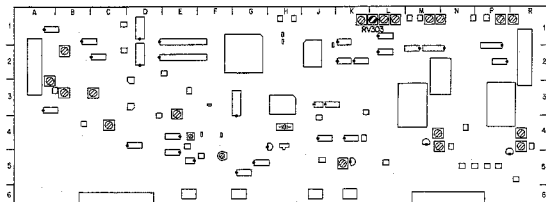
Conditions for adjustment	Adjustment point • Specifications
Step 2 • COMPONENT 2 INPUT; 50 % BOWTIE • INPUT SELECT switch / Sub control panel ; Y-R, B • Play back the recorded portion. Blank tape	Spec. difference on BOWTIE DIP point $\rightarrow 0 \pm 20 \text{ nsec}$  When specification is not satisfied $\rightarrow$ Adjust Step 1 again and check that perform Step 2.

## [Reference]

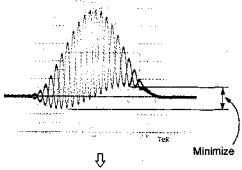
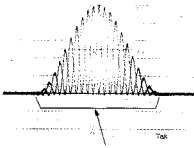
If not prepare the WFM300, connect the oscilloscope following figure for adjust.



## VRA-5 board (A Side)

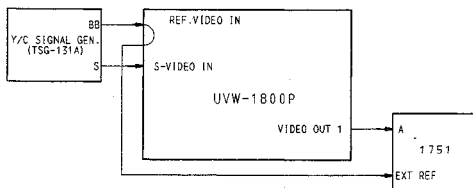


## 12-7-8. Overall Composite Y / C Delay Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• VIDEO INPUT ;</li> <li>• PULSE &amp; BAR</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>RV303 / VRA-5 (L-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or oscilloscope</p> <p>Before adjustment</p>  <p>↓</p> <p>After adjustment</p>  <p>Spec. Flat</p> <p>(If the readjustment is performed after Step 2, compensate the deviation measured in Step 2.)</p>
<p>CONNECTION 2</p> <p>Step 2</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• VIDEO INPUT ;</li> <li>• PULSE &amp; BAR</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> <li>• Play back the recorded portion. Blank tape</li> </ul> <p>CONNECTION 2</p>	<p>Spec. difference from at center <math>\rightarrow 0 \pm 30</math> nsec</p> <p>When specification is not satisfied <math>\rightarrow</math> Adjust Step 1 again and check that perform Step 2.</p>

# 12-7-9. Overall S-VIDEO Y / C Delay Adjustment

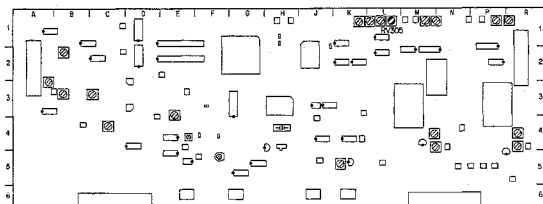
## [CONNECTION]



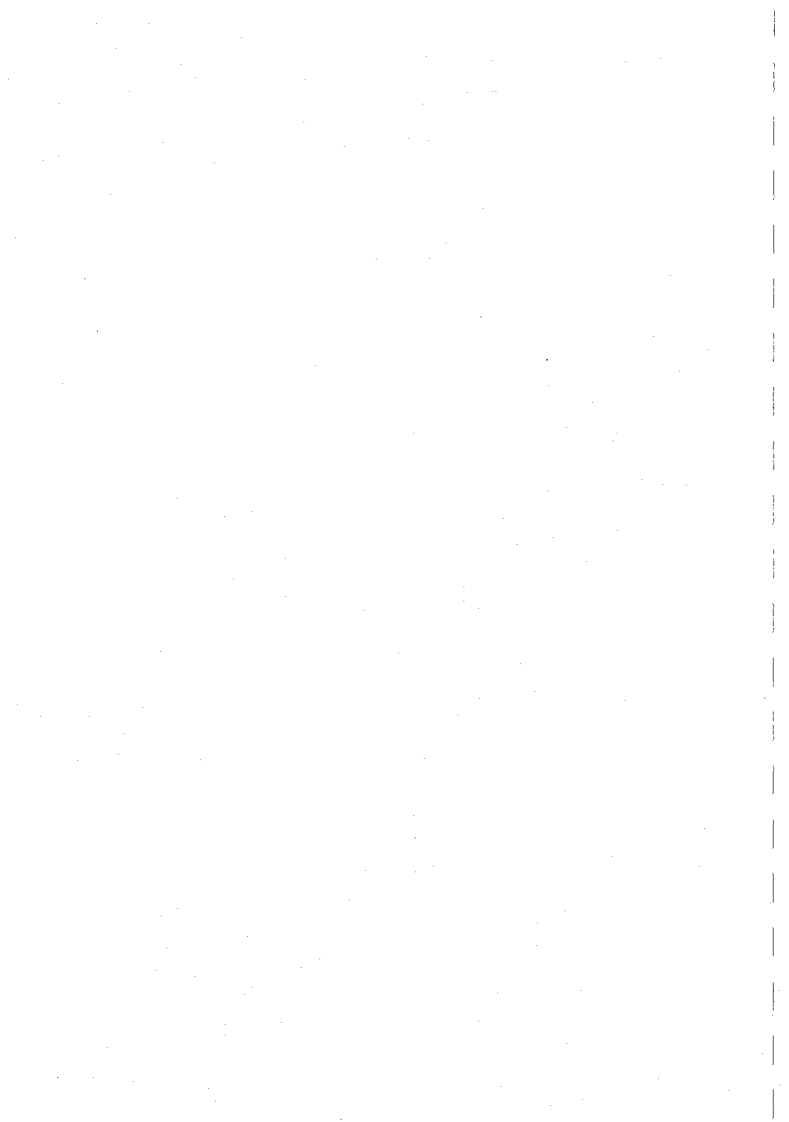
Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>EE mode</li> <li>S-VIDEO INPUT; PULSE &amp; BAR</li> <li>INPUT SELECT switch / Sub control panel ; S-VIDEO</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>RV305 / VRA-5 (L-1)</p> <p>TRIG : EXT / WFM</p> <p>WFM or Oscilloscope</p> <p>Before adjustment</p> <p>↓</p> <p>After adjustment</p>

Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• S-VIDEO INPUT ; PULSE &amp; BAR</li> <li>• INPUT SELECT switch / Sub control panel ; S-VIDEO</li> <li>• Play back the recorded portion. Blank tape</li> </ul>	<p>Spec. difference from center <math>\rightarrow 0 \pm 20 \text{ nsec}</math></p> <p>When specification is not satisfied <math>\rightarrow</math> Adjust Step 1 again and check that perform Step 2.</p>

VRA-5 board (A Side)







## SECTION 13

### ELECTRICAL ALIGNMENT AFTER REPLACEMENT BOARDS

Electrical adjustments are greatly simplified when circuit board is replaced. Refer to this section, not sections 9 through 12, for adjustment when circuit board is replaced which requires adjustment and / or setting.

This section provides the minimum but sufficient adjustment procedure for this purpose.

Some circuit boards require adjustment and / or resetting using the maintenance mode even though any electrical adjustment devices are not mounted on the circuit boards.

#### [EQUIPMENT]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Signal Generator
  - Audio SG (HP 8904 or equivalent)
  - Component SG (TEKTRONIX TSG-300 / TSG-131A or equivalent)
  - Composite SG (TEKTRONIX TSG-131A op. 03 or equivalent)
  - Y / C (TEKTRONIX TSG-131A)
- Audio Level Meter (HP 3400A or equivalent)
- Waveform Monitor (WFM)
  - Component (TEKTRONIX WFM300 / 300A / 1781 / 1765 op. SC or equivalent)
  - Composite (TEKTRONIX 1751 / 1781 / 1765 op. SC or equivalent)
- Spectrum Analyzer (ADVANTEST R4131 B / D or equivalent)
- Sweep Generator (SHIBASOKU VS-12CX or equivalent)
- Picture Monitor
- Frequency Counter
- Current Probe (TEKTRONIX P6022 or equivalent)
- Blank Tape (metal) BCT-20MA or equivalent
  - Note : "Blank Tape" indicates a cassette tape on which no video / audio signals are recorded.
- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)
- Alignment Tape CR8-1B PS (Part No. 8-960-096-86)

## Contents

TIME min. s	VIDEO TRACK	AFM
0 : 00	RF Sweep	No-Signal
2 : 00	Marker 1, 2, 4, 6, 8, 10, 12 MHz	
5 : 00	60 % H-Sweep (CTDM) Marker 0.5, 1, 2, 3, 4, 5 MHz	
	Pulse & Bar (CTDM)	
8 : 00	60 % Multi Burst Y : 0.5, 1, 2, 4, 5, 5.5 MHz C : 0.2, 0.5, 1, 1.5, 2 MHz	
11 : 00	Pulse & Bar	
14 : 00		400 Hz Sine Wave
16 : 30	100 % Color Bars	25 kHz Deviation
17 : 00		75 kHz Deviation
19 : 00	50 % Bowtie & 10T	No-Signal
	Line 17A Signal	
22 : 00		
	Quad Phase	
24 : 00		
	50 % Flat Field	
26 : 00		
	100 % Color Bars with Dropout	
28 : 00		
	Composite H-Sweep with VISC	
30 : 00		

Contents

TIME min. s	AUDIO TRACK
0:00	1 kHz / 0 VU
3:00	15 kHz / 0 VU
5:00	1 kHz / -20 VU
6:00	40 kHz / -20 VU
6:30	7 kHz / -20 VU
7:00	10 kHz / -20 VU
7:30	15 kHz / -20 VU
8:00	

- \*1. When this tape is reproduced in the audio reference level check or adjustment, the output level (0 dB) should be corrected according to the correction value as follows.

example) Correction value = -0.5 dB

Output level = 0 dB - 0.5 dB = -0.5 dB

[SWITCH / SETUP MENU SETTING]

This setting should be changed in position unless otherwise specified.

<Sub Control Panel>

INPUT SELECT : COMPOSITE  
 REMOTE / LOCAL : LOCAL  
 CTL / LTC / U-BIT : LTC  
 CHARACTER : ON  
 TC INPUT EXT / INT : INT

<Connector Panel>

AUDIO INPUT CH-1 600  $\Omega$  : ON  
 AUDIO INPUT CH-2 600  $\Omega$  : ON  
 Component 1 / 2 : 2

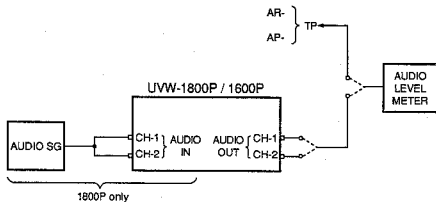
<Switch Setting on Printed Circuit Board>

S201-2 / SS-53 : CLOSE (ON) ···· NR OFF

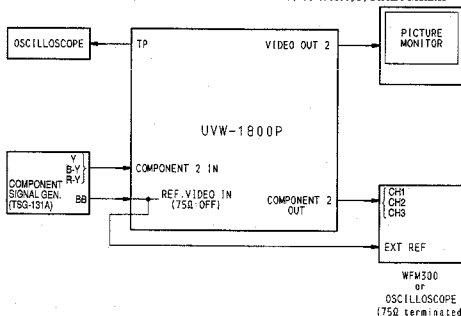
## [CONNECTION]

Connect some equipment as following unless otherwise specified.

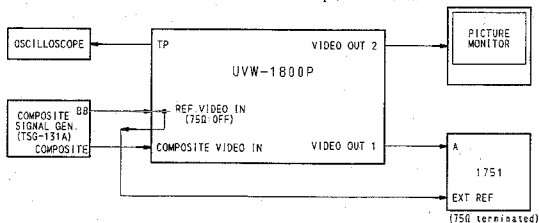
### CONNECTION 1 Audio SG HP8904 / Audio Level Meter HP3400A



### CONNECTION 2 SG : TSG-131A / Waveform Monitor : WFM-300 / Oscilloscope / Picture Monitor



### CONNECTION 3 SG : TSG-131A / Waveform Monitor : 1750 / Oscilloscope / Picture Monitor



## [AP, AR Board Preparations and Notes on Alignment]

### Preparations

#### Cleaning of stationary heads

Clean three stationary heads by the cleaning piece moistened with cleaning fluid.  
After the fluid blow off, wipe off the heads by a not-weaved cloth or cleaning piece.

### Making the Tape which not Recorded Audio Signals

#### Sub control panel switch setting

TC INPUT EXT / INT : INT

#### Level volume setting

CH-1 / CH-2 REC VR : MIN

#### Recording

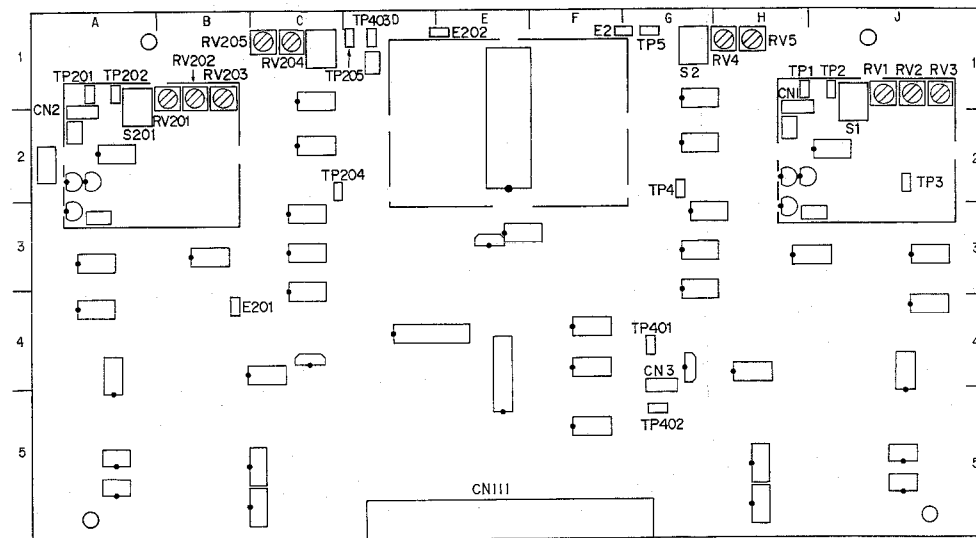
Record the blank tape BCT-20MA (or equivalent) from the top to the end.

(The tape which recorded CTL and TC without audio signals is completed, under the above-mentioned operation.)

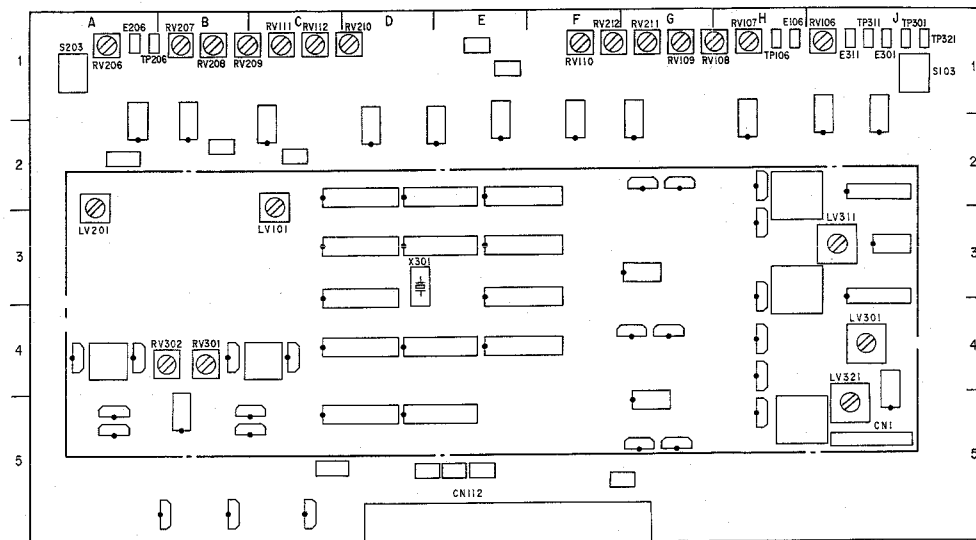
### Notes for alignment

- AUDIO MONITOR is terminated by 47 k $\Omega$ .
- AUDIO OUTPUT is terminated by 600  $\Omega$  (except designated in particular)
- When the alignment tape is played back, specification should be corrected according to the correction value mentioned in the tape level.
- The alignment tape is used within the limits of about 50 times and recommend to manage by marking.

AP-31 / 31A board (A Side)

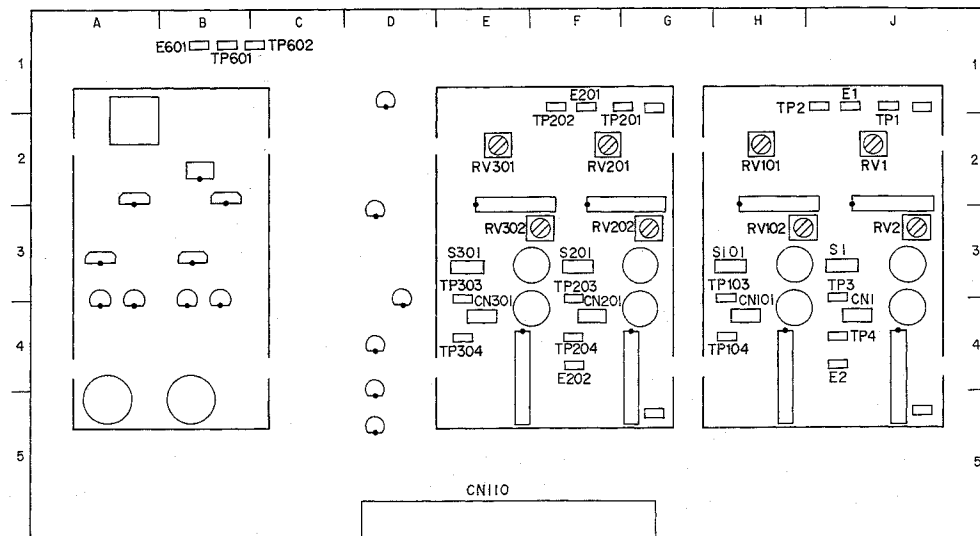


AR-14 board (A Side)

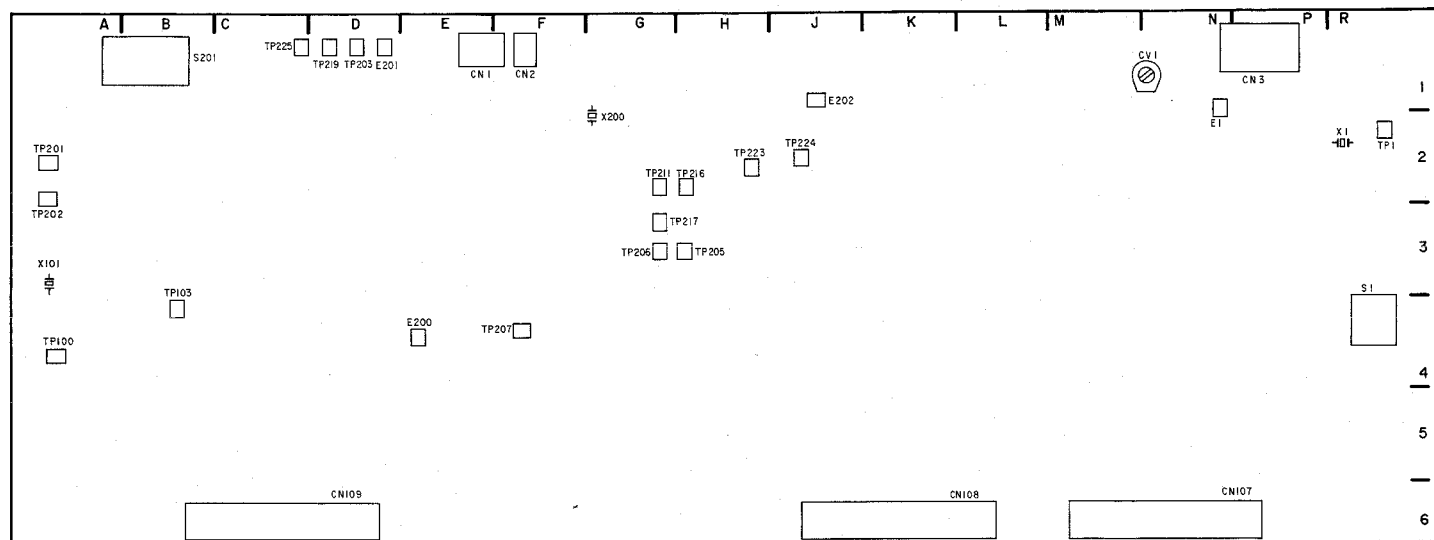




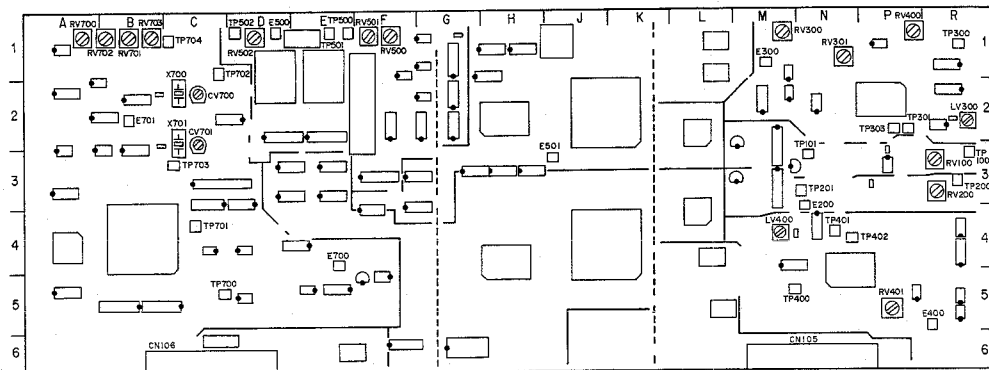
RP-70 board (A Side)



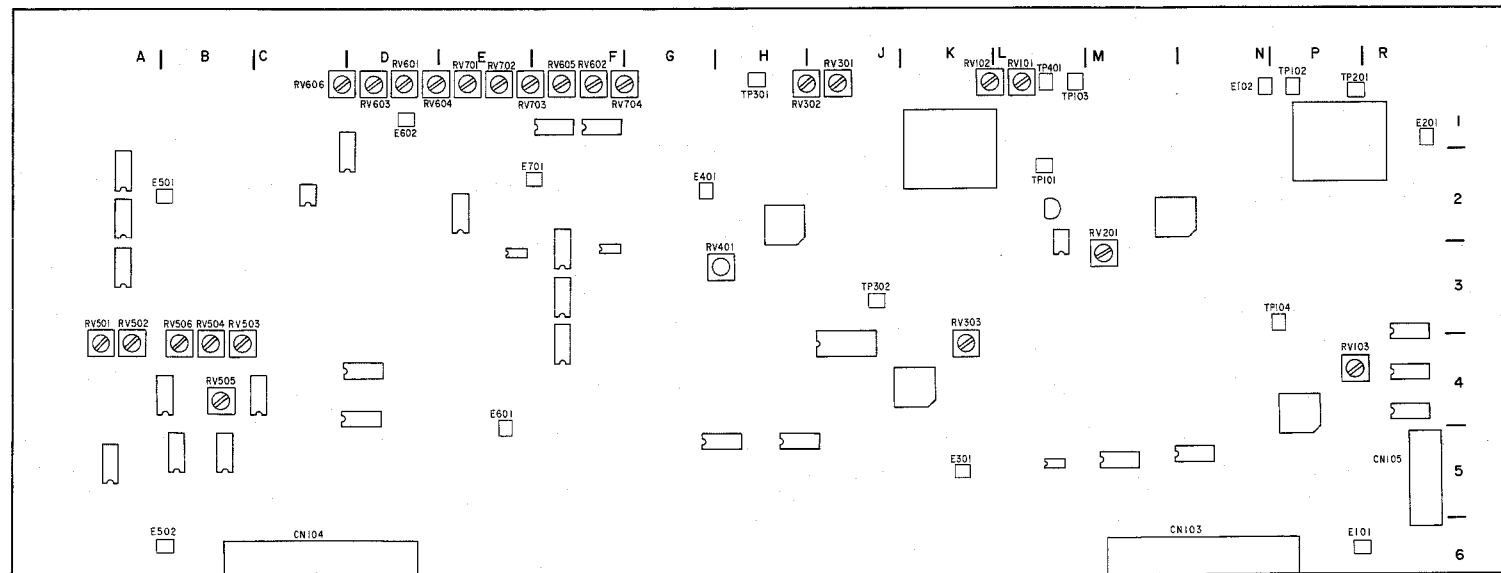
SS-53 board (A Side)



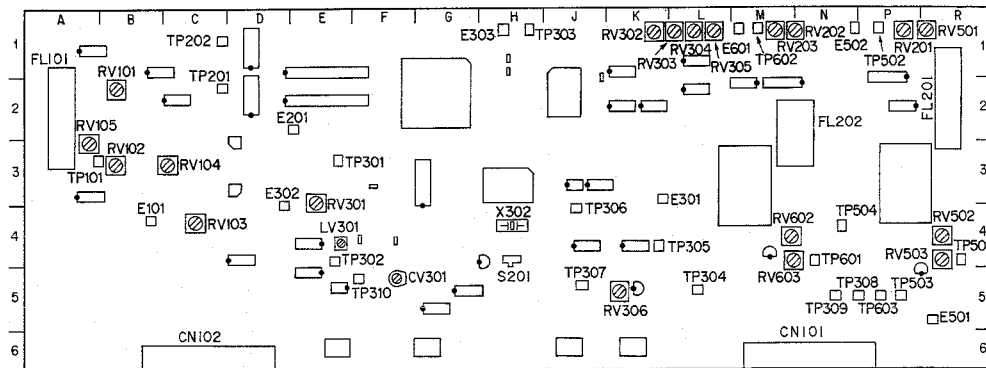
TBC-25 board (A Side)



VP-43 board (A Side)



VRA-5 board (A Side)



# UVW-1600P

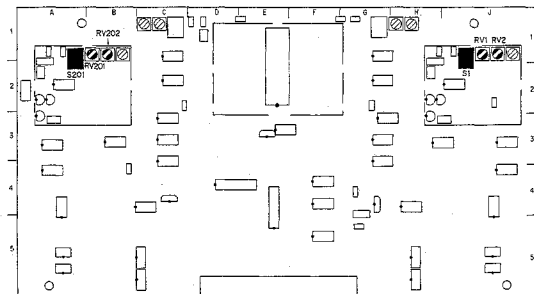
## AP-31A BOARD

### 1. PB MODE ADJUSTMENT

#### 1-1. PB Dolby off Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications										
<ul style="list-style-type: none"> <li>• PB mode</li> <li>1 kHz, 7 kHz, 10 kHz,</li> <li>15 kHz, -20 VU / CR8-1B PS</li> <li>(5:00 - 8:00)</li> </ul>	<p>AUDIO OUTPUT CH-1/2</p> <p>CH-1</p> <ul style="list-style-type: none"> <li>RV1 (10 kHz) / AP-31A (J-1)</li> <li>RV2 (7 kHz) / AP-31A (J-1)</li> </ul> <p>CH-2</p> <ul style="list-style-type: none"> <li>RV201 (10 kHz) / AP-31A (J-1)</li> <li>RV202 (7 kHz) / AP-31A (J-1)</li> </ul> <p>Adjust alternately</p> <p>If the specification of the high frequency is not satisfied, change the following switches and adjust again.</p> <p>CH-1 S1 / AP-31A (J-1)</p> <p>CH-2 S201 / AP-31A (A-1)</p> <p>Spec.</p> <table border="1"> <thead> <tr> <th>FREQUENCY [Hz]</th><th>OUTPUT LEVEL [dB]</th></tr> </thead> <tbody> <tr> <td>1 k</td><td>0 (REF)</td></tr> <tr> <td>7 k</td><td>0 ± 0.2</td></tr> <tr> <td>10 k</td><td>0 ± 0.2</td></tr> <tr> <td>15 k</td><td>-0.5 ± 0.5</td></tr> </tbody> </table>	FREQUENCY [Hz]	OUTPUT LEVEL [dB]	1 k	0 (REF)	7 k	0 ± 0.2	10 k	0 ± 0.2	15 k	-0.5 ± 0.5
FREQUENCY [Hz]	OUTPUT LEVEL [dB]										
1 k	0 (REF)										
7 k	0 ± 0.2										
10 k	0 ± 0.2										
15 k	-0.5 ± 0.5										


AP-31A board (A Side)



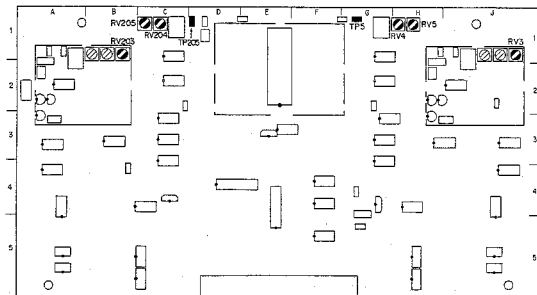
## 1-2. PB Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>PB mode</li> <li>1 kHz, 0 VU / CR8-1B PS</li> <li>(0:00 - 3:00)</li> </ul>	<p>Step 1</p> <p>CH-1 TP5 / AP-31A (G-1) RV3 / AP-31A (J-1)</p> <p>CH-2 TP205 / AP-31A (D-1) RV203 / AP-31A (B-1)</p> <p>Spec. <math>-10.0 \pm 0.1</math> dBu</p>
	<p>Step 2</p> <p>AUDIO OUTPUT CH-1 / 2</p> <p>CH-1 RV4 / AP-31A (H-1)</p> <p>CH-2 RV204 / AP-31A (C-1)</p> <p>Spec. <math>+4.0 \pm 0.2</math> dBu</p>

## 1-3. Audio Meter Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>PB mode</li> <li>1 kHz, 0 VU / CR8-1B PS</li> <li>(0:00 - 3:00)</li> </ul>	<p>Audio meter</p> <p>RV5 / AP-31A (H-1)</p> <p>RV205 / AP-31A (C-1)</p>  <p>Spec. The segment one step above 0 VU should be dimly lit</p>

AP-31A board (A Side)



# UVW-1800P

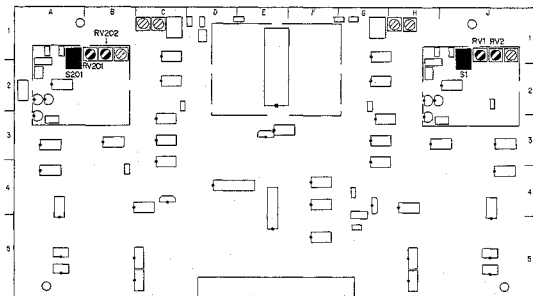
## AP-31 BOARD

### 1. PB MODE ADJUSTMENT

#### 1-1. PB Dolby off Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications										
<ul style="list-style-type: none"><li>• PB mode</li><li>1 kHz, 7 kHz, 10 kHz,</li><li>15 kHz, -20 VU / CR8-1B PS</li><li>(5:00 - 8:00)</li></ul>	<p>AUDIO OUTPUT CH-1 / 2</p> <p>CH-1</p> <ul style="list-style-type: none"><li>● RV1 (10 kHz) / AP-31 (J-1)</li><li>● RV2 (7 kHz) / AP-31 (J-1)</li></ul> <p>CH-2</p> <ul style="list-style-type: none"><li>● RV201 (10 kHz) / AP-31 (B-1)</li><li>● RV202 (7 kHz) / AP-31 (B-1)</li></ul> <p>Adjust alternately</p> <p>If the specification of the high frequency is not satisfied, change the following switches and adjust again.</p> <p>CH-1 S1 / AP-31 (J-1)</p> <p>CH-2 S201 / AP-31 (A-1)</p> <p>Spec.</p> <table><tr><th>FREQUENCY [Hz]</th><th>OUTPUT LEVEL [dB]</th></tr><tr><td>1 k</td><td>0 (REF)</td></tr><tr><td>7 k</td><td>0 ± 0.2</td></tr><tr><td>10 k</td><td>0 ± 0.2</td></tr><tr><td>15 k</td><td>-0.5 ± 0.5</td></tr></table>	FREQUENCY [Hz]	OUTPUT LEVEL [dB]	1 k	0 (REF)	7 k	0 ± 0.2	10 k	0 ± 0.2	15 k	-0.5 ± 0.5
FREQUENCY [Hz]	OUTPUT LEVEL [dB]										
1 k	0 (REF)										
7 k	0 ± 0.2										
10 k	0 ± 0.2										
15 k	-0.5 ± 0.5										

AP-31 board (A Side)



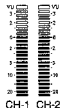


## 1-2. PB Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• PB mode</li> <li>1 kHz, 0 VU / CR8-1B PS</li> <li>(0:00-3:00)</li> </ul>	<div> <div>CH-1</div> <div>TP5 / AP-31 (G-1)</div> <div>RV3 / AP-31 (J-1)</div> </div> <div> <div>CH-2</div> <div>TP205 / AP-31 (D-1)</div> <div>RV203 / AP-31 (B-1)</div> </div> <div>Spec. <math>-10.0 \pm 0.1</math> dBu</div> <div>[Check]</div> <div>AUDIO OUTPUT CH-1 / 2</div> <div>Spec. <math>+4.0 \pm 0.2</math> dBu</div>

## 2. EE MODE ADJUSTMENT

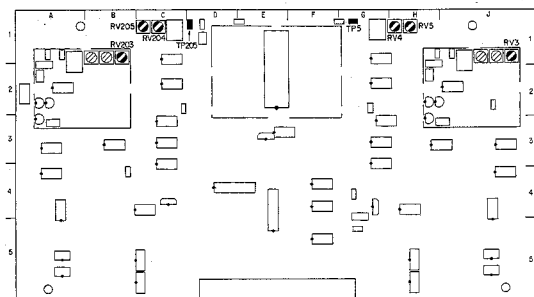
### 2-1. EE Input Level / Audio Meter Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• AUDIO INPUT CH-1 / 2 ;</li> <li>1 kHz, +4.00 dBu</li> <li>• EE mode</li> </ul>	<div>Step 1</div> <div> <div>CH-1</div> <div>TP5 / AP-31 (G-1)</div> <div>REC VR / Sub Control Panel</div> </div> <div> <div>CH-2</div> <div>TP205 / AP-31 (D-1)</div> <div>REC VR / Sub Control Panel</div> </div> <div>Spec. <math>-10.00 \pm 0.05</math> dBu</div> <div>Step 2</div> <div> <div>AUDIO METER</div> <div>RV5 / AP-31 (H-1)</div> </div> <div> <div>RV205 / AP-31 (C-1)</div> </div> <div>  </div> <div>Spec. The segment one step above 0 VU should be dimly lit</div>

## 2-2. EE Output Level Adjustment

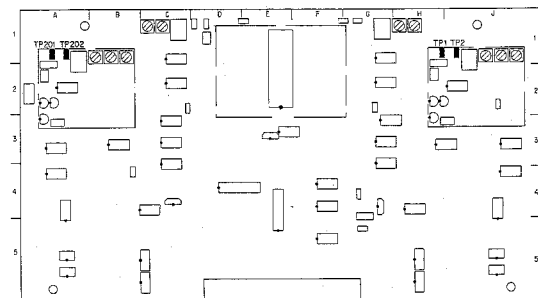
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1 / 2; 1 kHz, +4.0 dBu</li> <li>EE mode</li> </ul>	<p>AUDIO OUTPUT CH-1 / 2</p> <p>CH-1 ● RV4 / AP-31 (H-1)</p> <p>CH-2 ● RV204 / AP-31 (C-1)</p> <p>Spec. +4.0 ± 0.2 dBu</p>

AP-31 board (A Side)



AP-31 board (A Side)

APPLICATION 3-1, 3-2



## AR-14 BOARD

### 3. REC MODE ADJUSTMENT

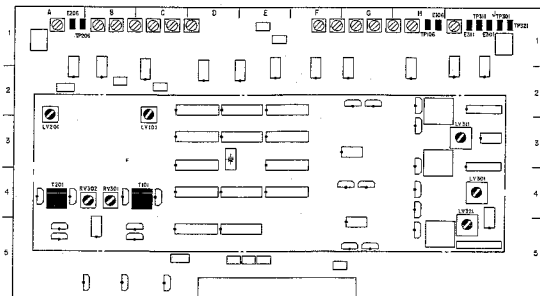
#### 3-1. Bias Trap Adjustment

Conditions for adjustment	Adjustment point • Specifications	
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1/2;</li> <li>No signal</li> <li>REC mode</li> <li>Blank tape</li> </ul>	CH-1	CH-2
	TP106 / AR-14 (H-1) GND : E106 (H-1) ⚙ LV101 / AR-14 (C-2)	TP206 / AR-14 (A-1) GND : E206 (A-1) ⚙ LV201 / AR-14 (A-2)
Spec. Bias leak → Minimize ( $\leq -30$ dBu)		

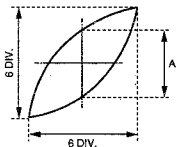
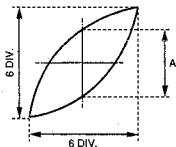
#### 3-2. Bias Current Adjustment

Conditions for adjustment	Adjustment point • Specifications	
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1/2;</li> <li>No signal</li> <li>REC mode</li> <li>Blank tape</li> </ul>	Step 1	
	TP1 / AP-31 (H-1) GND : TP2 (J-1) ⚙ T101 / AR-14 (C-4)	TP201 / AP-31 (A-1) GND : TP202 (A-1) ⚙ T201 / AR-14 (A-4)
Spec. Bias current → Maximize		
	Step 2	
	TP1 / AP-31 (H-1) GND : TP2 (J-1) ⚙ RV301 / AR-14 (B-4)	TP201 / AP-31 (A-1) GND : TP202 (A-1) ⚙ RV302 / AR-14 (B-4)
Spec. $16 \pm 1$ mV rms		

AR-14 board (A Side)



#### 4. AU / TC ERASE TUNE ADJUSTMENT

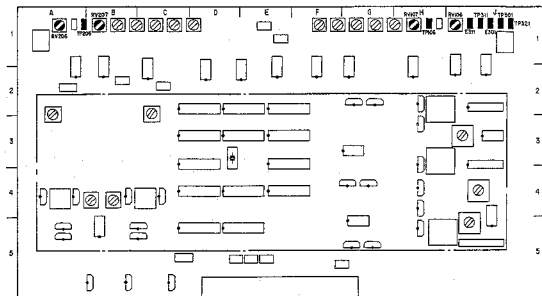
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1/2;</li> <li>No signal</li> <li>REC mode</li> <li>Blank tape</li> </ul>	<p>Step 1</p> <p>TP311 / AR-14 (H-2) GND : E311 (J-1) ● LV311 / AR-14 (J-3)</p> <p>Spec. level → maximize</p>
	<p>Step 2</p> <p>TP311 / AR-14 (H-2) GND : E311 (J-1) TP301 / AR-14 (H-3) GND : E301 (J-1) ● LV301 / AR-14 (C-2)</p> <p>Oscilloscope ; X-Y mode</p>  <p>phase difference between TP311 and TP301 Spec. <math>A \leq 0 \pm 10^\circ</math> (1 DIV.)</p>
	<p>Step 3</p> <p>TP311 / AR-14 (H-2) TP321 / AR-14 (H-5) GND : E311 (J-1) ● LV321 / AR-14 (C-2)</p> <p>Oscilloscope ; X-Y mode</p>  <p>phase difference between TP311 and TP321 Spec. <math>A \leq 0 \pm 10^\circ</math> (1 DIV.)</p>

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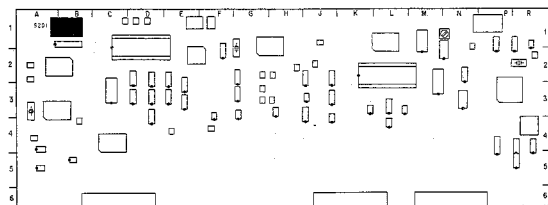
#### 4. AU / TC ERASE TUNE ADJUSTMENT (Continued)

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1 / 2 ;</li> <li>No signal</li> <li>REC mode</li> <li>Blank tape</li> </ul>	<p>Step 4</p> <p>CH-1 TP301 / AR-14 (J-1) GND : E301 (J-1)</p> <p>CH-2 TP311 / AR-14 (J-1) GND : E311 (J-1)</p> <p>TC TP321 / AR-14 (J-1) GND : E311 (J-1)</p> <p>Spec. <math>150 \pm 15</math> mV rms</p>

AR-14 board (A Side)



SS-53 board (A Side)



## 5. OVERALL ADJUSTMENT

### 5-1. Overall Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<b>Step 1</b> • AUDIO INPUT CH-1 / 2; 1 kHz, +4 dBu • Playback the recorded portion. Blank tape	<b>AUDIO OUTPUT CH-1 / 2</b>  Spec. + 4.0 ± 0.5 dBu  When specification is not satisfied → Step 2
<b>Step 2</b> • AUDIO INPUT CH-1 / 2; 1 kHz, +4 dBu • REC mode Blank tape	<div style="display: flex; justify-content: space-between;"> <div> <b>CH-1</b>            TP106 / AR-14 (H-1)            Ⓢ RV106 / AR-14 (J-1)         </div> <div> <b>CH-2</b>            TP206 / AR-14 (A-1)            Ⓢ RV206 / AR-14 (A-1)         </div> </div> <p>Correct the difference level from the center value in Step 1.</p> <p>After the adjustment, check that perform Step 1.</p>

### 5-2. Overall Frequency Response Adjustment (Dolby on)

Conditions for adjustment	Adjustment point • Specifications
<b>Step 1</b> • AUDIO INPUT CH-1 / 2; 12.5 kHz, +4 dBu • S201-2 / SS-53 (B-1); OPEN (OFF) ···· NR ON • Playback the recorded portion. Blank tape	<b>AUDIO OUTPUT CH-1 / 2</b>  Spec. + 3.5 ± 0.5 dBu  When specification is not satisfied → Step 2
<b>Step 2</b> • AUDIO INPUT CH-1 / 2; 12.5 kHz, +4 dBu • S201-2 / SS-53 (B-1); OPEN (OFF) ···· NR ON • REC mode Blank tape	<div style="display: flex; justify-content: space-between;"> <div> <b>CH-1</b>            TP106 / AR-14 (H-1)            Ⓢ RV107 / AR-14 (H-1)         </div> <div> <b>CH-2</b>            TP206 / AR-14 (A-1)            Ⓢ RV207 / AR-14 (B-1)         </div> </div> <p>Correct the difference level × 0.8 from the center value in Step 1.</p> <p>After the adjustment, check that perform Step 1.</p>

## 6. INSERT CROSSTALK ADJUSTMENT

### 6-1. TC Insert Crosstalk Adjustment

Conditions for adjustment	Adjustment point • Specifications				
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1 / 2; No signal</li> <li>TC insert mode</li> <li>Tape which not recorded audio signal</li> </ul> <p>[Putting the unit into TC insert mode] Select TC INSERT of EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel TC insert mode.</p> <p>[Cancel of TC insert mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-1 / 2</p> <table> <tr> <td>CH-1</td><td>CH-2</td></tr> <tr> <td> <ul style="list-style-type: none"> <li>RV111 / AR-14 (C-1)</li> <li>RV112 / AR-14 (C-1)</li> </ul> </td><td> <ul style="list-style-type: none"> <li>RV211 / AR-14 (G-1)</li> <li>RV212 / AR-14 (F-1)</li> </ul> </td></tr> </table> <p>Spec. The leak of TC signal → Minimize (<math>\leq -16</math> dBu)</p> <p>Adjust CH-1 and CH-2 by the each two RVs alternately</p>	CH-1	CH-2	<ul style="list-style-type: none"> <li>RV111 / AR-14 (C-1)</li> <li>RV112 / AR-14 (C-1)</li> </ul>	<ul style="list-style-type: none"> <li>RV211 / AR-14 (G-1)</li> <li>RV212 / AR-14 (F-1)</li> </ul>
CH-1	CH-2				
<ul style="list-style-type: none"> <li>RV111 / AR-14 (C-1)</li> <li>RV112 / AR-14 (C-1)</li> </ul>	<ul style="list-style-type: none"> <li>RV211 / AR-14 (G-1)</li> <li>RV212 / AR-14 (F-1)</li> </ul>				

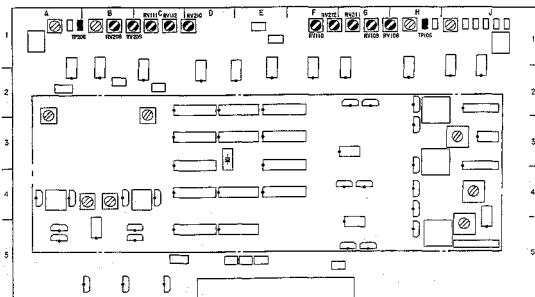
### 6-2. Audio CH-1 Insert Crosstalk Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1; 15 kHz, +4.0 dBu</li> <li>AUDIO INPUT CH-2; No signal</li> <li>AUDIO CH-1; Insert mode</li> <li>Tape which not recorded audio signal</li> </ul> <p>[Putting the unit into AUDIO CH-1 insert mode] Select A1 INSERT of EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel AUDIO CH-1 insert mode.</p> <p>[Cancel of AUDIO CH-1 mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-2</p> <ul style="list-style-type: none"> <li>RV108 / AR-14 (H-1)</li> <li>RV109 / AR-14 (G-1)</li> <li>RV110 / AR-14 (F-1)</li> </ul> <p>Spec. The leak of CH-1 → Minimize (<math>\leq -14</math> dBu)</p> <p>Adjust three RVs alternately</p>

### 6-3. Audio CH-2 Insert Crosstalk Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>AUDIO INPUT CH-1 ; No signal</li> <li>AUDIO INPUT CH-2 ; 15 kHz, +4.0 dBu</li> <li>AUDIO CH-2; Insert mode</li> </ul> <p>Tape which not recorded audio signal</p> <p>[Putting the unit into AUDIO CH-2 insert mode] Select A2 INSERT of EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel AUDIO CH-2 insert mode.</p> <p>[Cancel of AUDIO CH-2 mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-1</p> <ul style="list-style-type: none"> <li>RV208 / AR-14 (B-1)</li> <li>RV209 / AR-14 (B-1)</li> <li>RV210 / AR-14 (D-1)</li> </ul> <p>Spec. The leak of CH-1 → Minimize (<math>\leq -14</math> dBu)</p> <p>Adjust three RVs alternately</p>

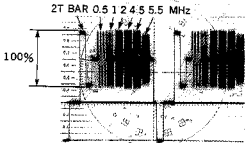
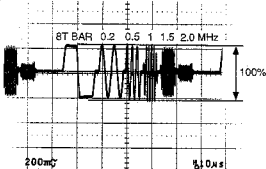
AR-14 board (A Side)





# RP-70 BOARD

## 1. Component Y and C Overall Frequency Response Check

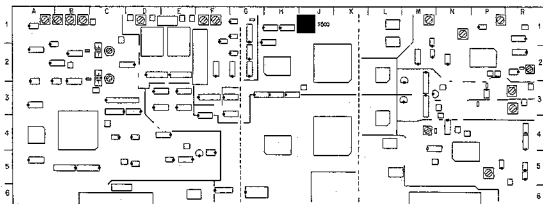
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>COMPONENT 2 INPUT ;</li> <li>60 % multi burst signal</li> <li>INPUT SELECT switch /</li> <li>Sub control panel ; Y-R, B</li> <li>Playback the recorded portion.</li> <li>Blank tape</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. (1) Check the levels for following frequencies.</p> <p>2T BAR reference 100 % (or 0 dB)</p> <p>0.5 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)</p> <p>1 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)</p> <p>2 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)</p> <p>4 MHz = 91 % (98 thru 85 %) (<math>-0.8 \pm 0.6</math> dB)</p> <p>5 MHz = 79 % (94 thru 67 %) (<math>-2.0 \pm 1.5</math> dB)</p> <p>(2) Check that both waveforms of CH-A and CH-B satisfied with the specification.</p> <p>(3) Flicker should not be on the monitor picture.</p> <p>(4) When specification is not satisfied, performed the "3. Y REC current adjustment Step 3" finely.</p> <p>COMPONENT 2 R-Y OUT / B-Y OUT (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. (1) Check the levels for following frequencies.</p> <p>8T BAR reference 100 % (or 0 dB)</p> <p>0.2 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)</p> <p>0.5 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)</p> <p>1 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)</p> <p>1.5 MHz = 87 % (94 thru 78 %) (<math>-1.2 \pm 0.8</math> dB)</p> <p>(2) Check that both waveforms of CH-A and CH-B satisfied with the specification.</p> <p>(3) When specification is not satisfied, performed the "4. C REC current adjustment Step 2" finely.</p>

CONNECTION 2

## 2. Component Y and C Overall Over Modulation Check

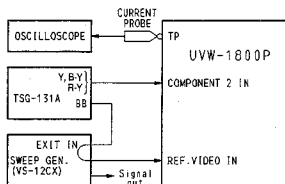
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• COMPONENT 2 INPUT; H sweep signal (125 %)</li> <li>• INPUT SELECT switch / Sub control panel; Y-R, B</li> <li>• Connect a color monitor to VIDEO OUT 2</li> <li>• Playback the recorded portion. Blank tape</li> </ul>	<p>VIDEO OUT 2</p> <p>Spec. (1) Playback : Over modulation should not be on the monitor picture. (2) Still : Over modulation should not be on the center of the monitor picture.</p> <p>When specification is not satisfied → Perform the head friction check. Head friction is not serious, perform the check in Section 12-5-12. Y Deviation Adjustment, Section 12-5-13. C Deviation Adjustment.</p> <p>The check was normally, perform 3. Y REC Current Adjustment Step 3, 4. C REC Current Adjustment Step 3. And performing increase or decrease within the specification.</p>
<ul style="list-style-type: none"> <li>• COMPONENT 2 INPUT; H sweep signal (100 %)</li> <li>• INPUT SELECT switch / Sub control panel; Y-R, B</li> <li>• S500-2 / TBC-25 (J-1); CLOSE (ON) ... Y MUTE</li> <li>• Connect a color monitor to VIDEO OUT 2</li> <li>• Playback the recorded portion. Blank tape</li> <li>• After check is completed, set S500- 2 / TBC-25 to OFF.</li> </ul>	<p>VIDEO OUT 2</p> <p>Spec. (1) Playback : Over modulation should not be on the monitor picture. (2) Still : Over modulation should not be on the center of the monitor picture.</p>

TBC-25 board (A Side)



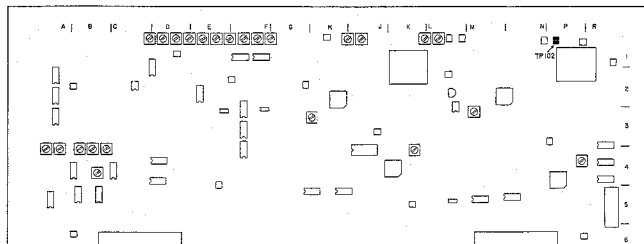
### 3. Y REC Current Adjustment

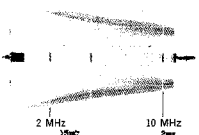
[CONNECTION for Step 1, 2]



Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• EE mode</li> <li>• Connect TP1-B1 / RP-70 (J-1) (J-1) with a shorting clip.</li> <li>• Connect the HOT side of a sweep generator output to TP2 / RP-70 (J-1) and the GND side to TP1 (J-1).</li> </ul>	<p>TP2 / RP-70 (J-1)</p> <p>⊗ Level control / sweep generator</p> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p> <p>Spec. <math>A = 0.40 \pm 0.02</math> Vp-p at 5 MHz</p>

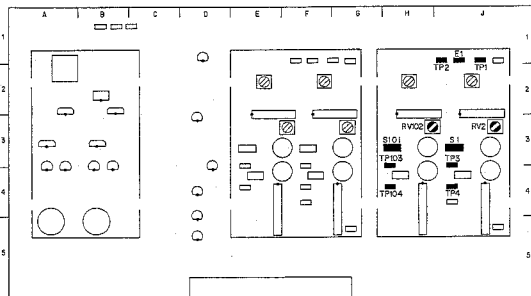
VP-43 board (A Side)



Conditions for adjustment	Adjustment point • Specifications	
<b>Step 2</b> <ul style="list-style-type: none"> <li>• S1, S101 / RP-70 (J-3) (H-3); OPEN (OFF)</li> <li>• Short TP3-TP4 / RP-70 (J-3) (J-4) and TP103-TP104 / RP-70 (H-3) (H-4) with shorting clip and measure with current probe.</li> <li>• Supply the sweep signal from the sweep generator connected between TP2-TP1 / RP-70 (J-1) (J-1).</li> <li>• REC mode Blank tape</li> </ul> <p>• After adjustment is completed, remove the shorting clip connected between TP1-E1 and sweep signal input.</p>	<b>YA</b> TP3-TP4 / RP-70 (J-3) (J-4) RV2 / RP-70 (J-3)	<b>YB</b> TP103-TP104 / RP-70 (H-3) (H-4) RV102 / RP-70 (H-3)
	<b>TRIG : TP102 / VP-43 (P-1)</b>	
	<b>Oscilloscope</b>	
		
	Spec. 2 MHz reference (100 %), 10 MHz = 65 ± 3 %	

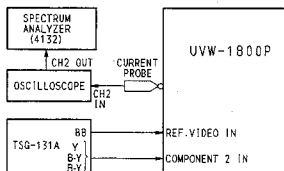
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RP-70 board (A Side)



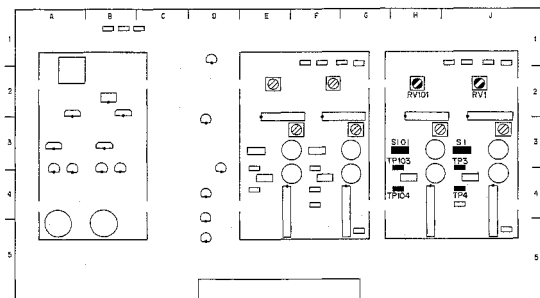
### 3. Y REC Current Adjustment (Continued)

[CONNECTION for Step 3]

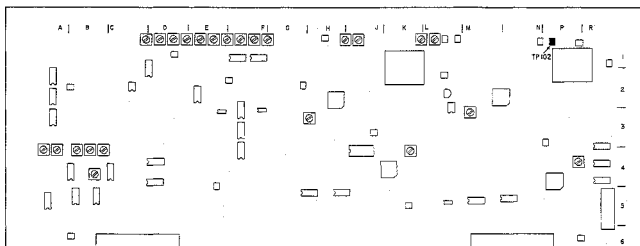


Conditions for adjustment	Adjustment point • Specifications
Step 3 • COMPONENT 2 INPUT; 50 % flat field • INPUT SELECT switch (sub control panel); Y-R, B • REC mode Blank tape	<div style="display: flex; justify-content: space-between;"> <div> <b>YA</b>            TP3-TP4 / RP-70 (J-3) (J-4)            ● RV1 / RP-70 (J-2)         </div> <div> <b>YB</b>            TP103-TP104 / RP-70 (H-3) (H-4)            ● RV101 / RP-70 (H-2)         </div> </div> <p style="text-align: center;">TRIG : TP102 / VP-43 (P-1)</p> <p style="text-align: center;">Oscilloscope</p> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>20mV      2μs</p> </div> <p style="text-align: center;">Spec. A = 45 ± 10 mA</p>

RP-70 board (A Side)

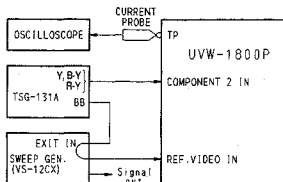


VP-43 board (A Side)



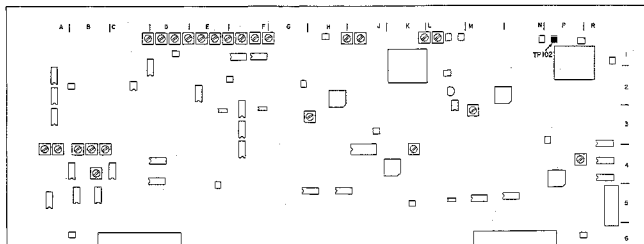
#### 4. C REC Current Adjustment

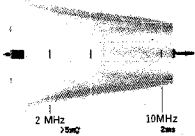
[CONNECTION for Step 1, 2]



Conditions for adjustment	Adjustment point • Specifications
<b>Step 1</b> <ul style="list-style-type: none"> <li>• EE mode</li> <li>• Short TP201 – E201 / RP-70 (G-1) (F-1) with a short clip.</li> <li>• Connect the HOT side of a sweep generator output to TP202 / RP-70 (F-1) and the GND side to TP201 (G-1).</li> </ul>	<p>TP202 / RP-70 (F-1)</p> <p>● Level control / sweep generator</p> <p>TRIG: INT</p> <p>Oscilloscope</p> <p>Spec. <math>A = 0.40 \pm 0.02</math> Vp-p at 5 MHz</p>

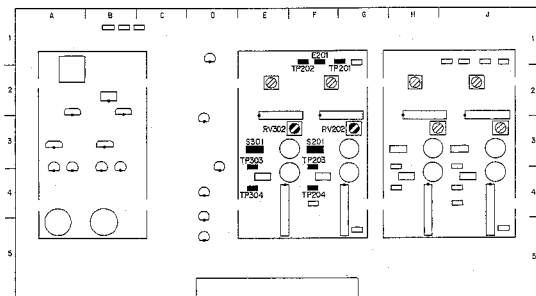
VP-43 board (A Side)



Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> <li>S201, S301 / RP-70 (F-3) (E-3) ; OPEN (OFF)</li> <li>Connect TP203 – TP204 / RP-70 (F-3) (F-4) and TP303 – TP304 / RP-70 (E-3) (E-4) with shorting clip and measure with current probe.</li> <li>Supply the sweep signal from the sweep generator connected between TP201 – TP202 / RP-70 (G-1) (F-1).</li> <li>REC mode Blank tape</li> <li>After adjustment is completed, remove the shorting clip connected between TP201-E201 and sweep signal input.</li> </ul>	<p>CA TP203-TP204 / RP-70 (F-3) (F-4)  <b>RV202</b> / RP-70 (G-3)</p> <p>CB TP303-TP304 / RP-70 (E-3) (E-4)  <b>RV302</b> / RP-70 (F-3)</p> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p>  <p>Spec. 2 MHz reference (100 %), 10 MHz = <math>60 \pm \frac{30}{50}</math> %</p>

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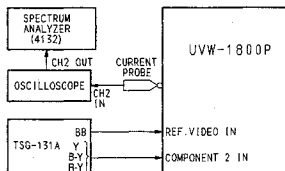
RP-70 board (A Side)





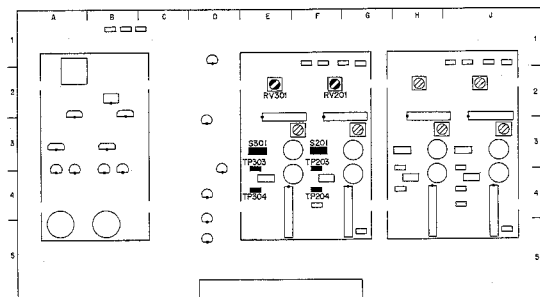
#### 4. C REC Current Adjustment (Continued)

[CONNECTION for Step 3]

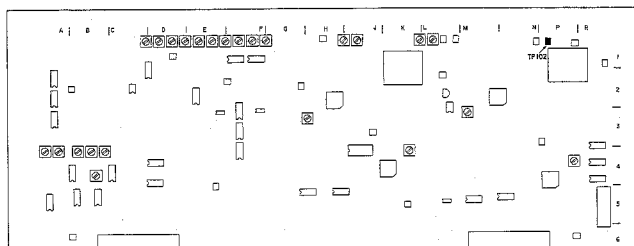


Conditions for adjustment	Adjustment point • Specifications
<b>Step 3</b> <ul style="list-style-type: none"> <li>COMPONENT 2 INPUT ; 50 % flat field</li> <li>INPUT SELECT switch / Sub control panel ; Y-R, B</li> <li>REC mode</li> <li>Blank tape</li> </ul>	<div style="display: flex; justify-content: space-between;"> <div> <b>CA</b>                      TP203-TP204 / RP-70 (F-3) (F-4)                      ● RV201 / RP-70 (F-2)                 </div> <div> <b>CB</b>                      TP303-TP304 / RP-70 (E-3) (E-4)                      ● RV301 / RP-70 (E-2)                 </div> </div> <p style="text-align: center;">TRIG : TP102 / VP-43 (P-1)</p> <p style="text-align: center;">Oscilloscope</p> <div style="text-align: center;"> </div> <p style="text-align: center;">10mV      2ms</p> <p style="text-align: center;">Spec. A = 50 ± 10 mA</p>

RP-70 board (A Side)

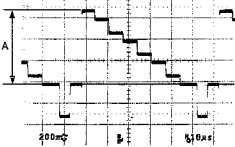


VP-43 board (A Side)



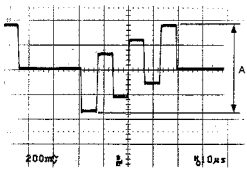
## TBC-25 BOARD

### 1. PB Component Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14:00 – 17:00)</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> Terminated)</p> <p>COMPONENT Y</p> <p>RV500 / TBC-25 (F-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.007</math> V</p>

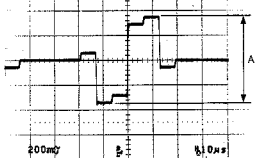
CONNECTION 2

### 2. PB Component B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14:00 – 17:00)</li> </ul>	<p>COMPONENT 2 B-Y OUT (75 <math>\Omega</math> Terminated)</p> <p>RV501 / TBC-25 (F-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.007</math> V</p>

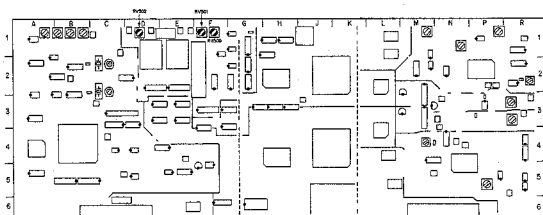
CONNECTION 2

### 3. PB Component R-Y Level Adjustment

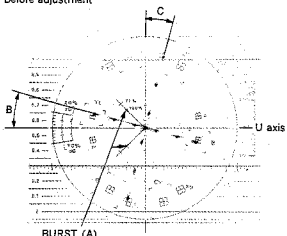
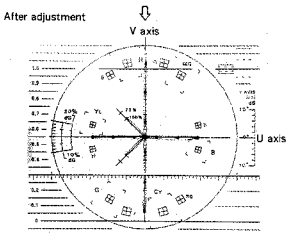
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14:00 – 17:00)</li> </ul>	<p>COMPONENT 2 R-Y OUT (75 <math>\Omega</math> Terminated)</p> <p>RV502 / TBC-25 (D-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.007</math> V</p>

CONNECTION 2

TBC-25 board (A Side)

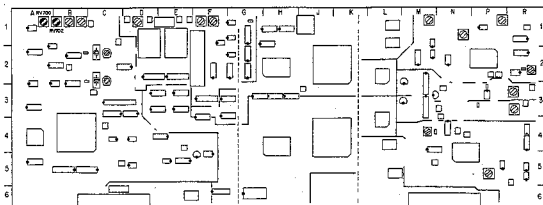


#### 4. U-V Axis Phase (B-Y, R-Y Phase) Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>QUAD PHASE / CR5-1B PS (22:00 - 24:00)</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) Burst axis  <b>RV700 / TBC-25 (A-1)</b></p> <p>(B) U axis (HUE)  <b>RV702 / TBC-25 (B-1)</b></p> <p>(C) V axis (U / V OFFSET)  <b>RV700 / TBC-25 (A-1)</b></p> <p>TRIG : REF. VIDEO</p> <p>Vector</p> <p>Before adjustment</p>  <p>After adjustment</p>  <p>Spec. (A) Set the dot of the burst on the right position on the scale.</p> <p>(B) Set the dots of the B-Y on the U axis of the vector.  <math>B = 0 \pm 1^\circ</math></p> <p>(C) Set the dots of the R-Y on the V axis of the vector.  <math>C = 0 \pm 1^\circ</math></p>

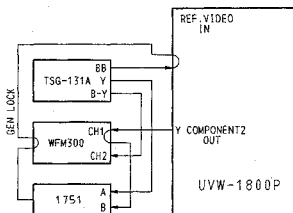
CONNECTION 3

TBC-25 board (A Side)

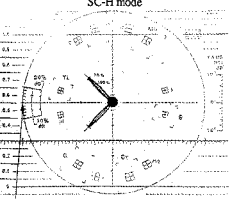
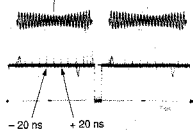


## 5. PB Video Phase Adjustment

[CONNECTION for Step 1 to 3]



Conditions for adjustment	Adjustment point • Specifications
<b>Step 1</b> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode 50 % BOWTIE &amp; 10T / CRS-1B PS (17:00 ~ 19:00)</li> <li>COMPONENT 2 INPUT; 50 % BOWTIE</li> <li>Set the following setting Waveform Vector (1751). WFM mode SWEEP : 1 <math>\mu</math>s (2H/MAG) FILTER : FLAT EXT REF : EXT GAIN : <math>\times 1</math></li> </ul>	<div style="display: flex; justify-content: space-between;"> <div> <b>CH-A</b>  <input checked="" type="radio"/> HORIZ POS control / Vector         </div> <div> <b>CH-B</b>  <input checked="" type="radio"/> SYNC control / Sub control panel         </div> </div> <p style="text-align: center;">TRIG : EXT / WFM</p> <p style="text-align: center;">WFM mode</p>

Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode 50 % BOWTIE &amp; 10T / CR5-1B PS (17:00 – 19:00)</li> <li>COMPONENT 2 INPUT; 50 % BOWTIE</li> <li>Use the Waveform Vector (1751) on SC-H mode.</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>● SYNC control / Sub control panel</p> <p>TRIG : EXT / WFM</p> <p>SC-H mode</p>  <p>SYNC CH-A → CH-B</p> <p>Spec. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with the SYNC control on the sub control panel. (Note : The dot position should be adjust in the direction of the shortest movement.)</p>
<p>Step 3</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode 50 % BOWTIE &amp; 10T / CR5-1B PS (17:00 – 19:00)</li> <li>INPUT SELECT switch / Sub control panel ; Y-R, B</li> <li>WFM300; BOWTIE mode (WFM)</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>● RV300 / TBC-25 (M-1)</p> <p>TRIG : EXT / WFM</p> <p>WFM</p> <p>CH-1 / CH-2 0 ns</p>  <p>-20 ns +20 ns</p> <p>Spec. Set the BOWTIE DIP points (cross points of the CH-1 and CH-2) on the center marker. <math>0 \pm 20 \text{ nsec}</math></p>

Continues to the next page.

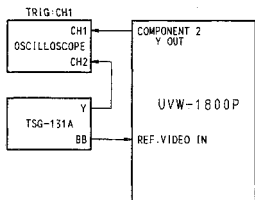


## 5. PB Video Phase Adjustment (Continued)

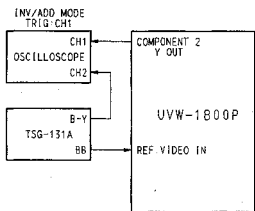
### [Reference]

If not prepare the WFM300 / 1751, connect the oscilloscope following figure and adjust Step 1 and 3.

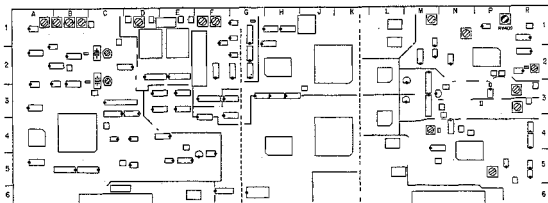
#### [Connection for Step 1]



#### [Connection for Step 3]

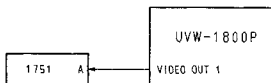


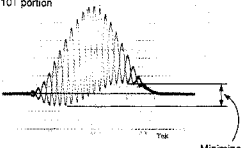
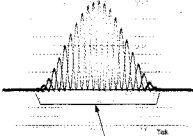
TBC-25 board (A Side)



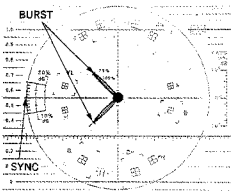
## 6. PB Composite Y / C Delay Adjustment

[CONNECTION]

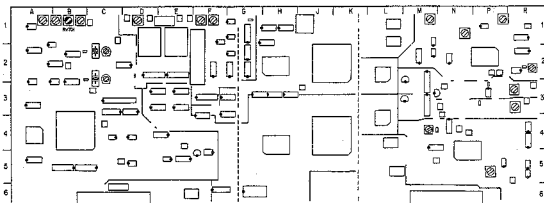


Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode LINE 17A / CR5-1B PS (19 : 00 – 22 : 00)</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>● RV400 / TBC-25 (P-1)</p> <p>TRIG : INT / WFM</p> <p>WFM</p> <p>Before adjustment</p> <p>10T portion</p>  <p>↓</p> <p>After adjustment</p>  <p>Spec. Flat</p>

## 7. INT SCH Phase Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode 100 % color bar (CR5-1B PS) (14:00 - 17:00)</li> <li>REF. VIDEO INPUT ; No signal</li> <li>Use the Waveform Vector (1751) on SC-H mode.</li> </ul> <p>After adjustment is completed, connect the REF. VIDEO INPUT connector.</p> <p>CONNECTION 3</p>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) Burst Adjustment ● PHASE control / Vector</p> <p>(B) INT SC ● RV701 / TBC-25 (B-1)</p> <p>TRIG : INT / WFM</p> <p>SC-H mode</p>  <p>Spec. (A) Set the dot of the burst on the normal position on the scale. (B) The SYNC should be in the center of the burst. (SCH = 0°)</p>

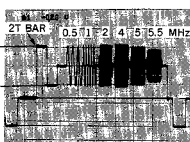
TBC-25 board (A Side)



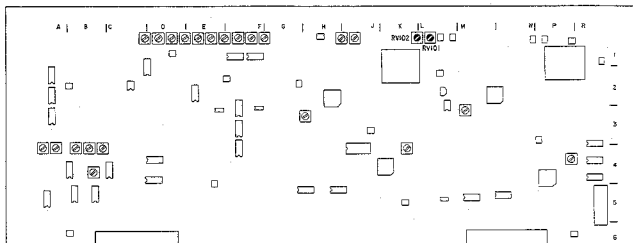
## VP-43 BOARD

**Note :** When replaced the VP-43 board, perform the TBC-25 board adjustment too.

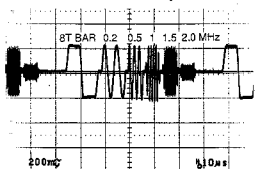
### 1. PB Component Y Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• PB mode</li> </ul> <p>Multi burst signal / CR5-1B PS (8 : 00 – 11 : 00)</p>	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Ach</p> <p>● RV101 / VP-43 (L-1)</p> </div> <div style="text-align: center;"> <p>Bch</p> <p>● RV102 / VP-43 (K-1)</p> </div> </div> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. (1) 2T BAR reference 100 % (or 0 dB)  4 MHz = 98 % (100 thru 96 %) (-0.8 ± 0.3 dB)  (2) Check the levels for following frequencies.  0.5 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)  1 MHz = 97 % (104 thru 90 %) (-0.3 ± 0.6 dB)  2 MHz = 94 % (101 thru 88 %) (-0.5 ± 0.6 dB)  5 MHz = 79 % (94 thru 67 %) (-2.0 ± 1.5 dB)  (3) Flicker should not be on the monitor picture.</p>

**VP-43 board (A side)**

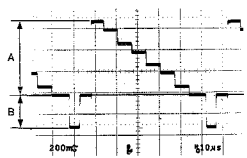


## 2. PB Component C Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>Multi burst signal / CR5-1B PS (8:00 - 11:00)</li> </ul>	<p>COMPONENT 2 R-Y / B-Y OUT (75 <math>\Omega</math> terminated)</p> <p>Ach <math>\odot</math> RV301 / VP-43 (J-1)      Bch <math>\odot</math> RV302 / VP-43 (H-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. (1) R-Y        8T BAR reference 100 % (or 0 dB)        1.0 MHz = 97 % (99 thru 94 %) (<math>-0.3 \pm 0.2</math> dB)        (2) Check the levels for following frequencies.        0.2 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)        0.5 MHz = 100 % (107 thru 94 %) (<math>0 \pm 0.6</math> dB)        1.5 MHz = 87 % (93 thru 78 %) (<math>-1.2 \pm 1.5</math> dB)        (3) Check that the waveform of B-Y satisfies the specifications above. When specification is not satisfied, perform fine adjustments so that both waveforms of R-Y and B-Y satisfy the specification.</p>

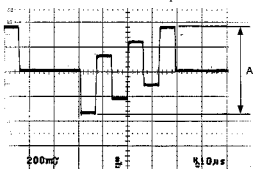
CONNECTION 2

## 3. PB Component Y Level Adjustment <TBC-25 Board>

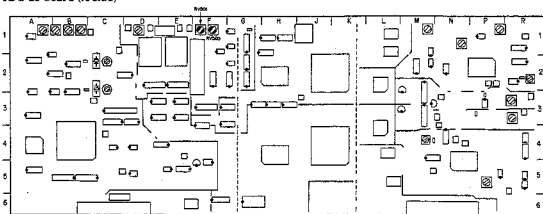
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14:00 - 17:00)</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>(A) COMPONENT Y <math>\odot</math> RV500 / TBC-25 (F-1)      (B) Check</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. A = <math>0.700 \pm 0.007</math> V (ADJUSTMENT)        B = <math>0.300 \pm 0.009</math> V (CHECK)</p>

CONNECTION 2

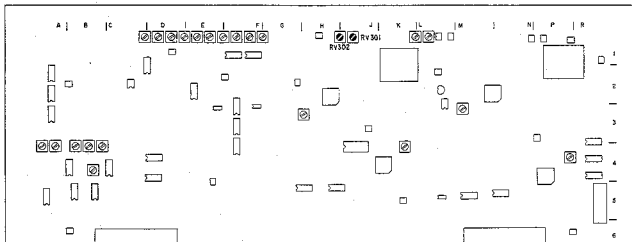
#### 4. PB Component B-Y Level Adjustment <TBC-25 Board>

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14:00 – 17:00)</li> </ul> <p>CONNECTION 2</p>	<p>COMPONENT 2 B-Y OUT (75 <math>\Omega</math> terminated)</p> <p>● RV501 / TBC-25 (F-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.007</math> Vp-p</p>

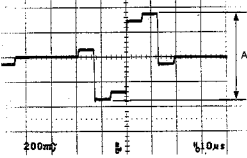
TBC-25 board (A side)



VP-43 board (A side)

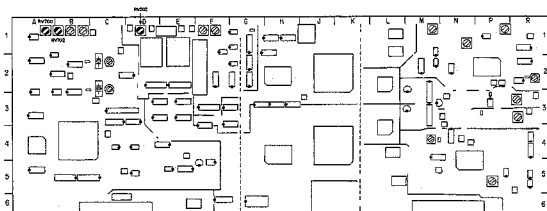


# 5. PB Component R-Y Level Adjustment <TBC-25 Board>

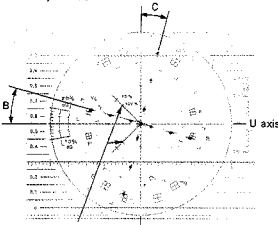
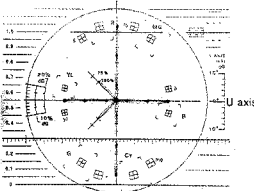
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CRS-1B PS (14:00 - 17:00)</li> </ul>	<p>COMPONENT 2 R-Y OUT (75 Ω terminated)</p> <p>● RV502 / TBC-25 (D-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.700 \pm 0.007</math> Vp-p</p>

CONNECTION 2

TBC-25 board (A side)



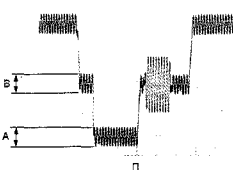
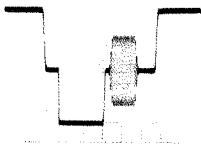
# 6. U-V Axis Phase (B-Y, R-Y Phase) Adjustment <TBC-25 Board>

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode QUAD PHASE / CR5-1B PS (22:00 - 24:00)</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) Burst  <input checked="" type="checkbox"/> PHASE control / Vector</p> <p>(B) U axis (HUE)  <input checked="" type="checkbox"/> RV702 / TBC-25 (B-1)</p> <p>(C) V axis (U / V OFFSET)  <input checked="" type="checkbox"/> RV700 / TBC-25 (A-1)</p> <p>TRIG : REF. VIDEO.</p> <p>Vector</p> <p>Before adjustment</p>  <p>After adjustment</p>  <p>Spec. (A) Set the dot of the burst on the right position on the scale.          (B) Set the dots of the B-Y on the U axis of the vector.  <math>B = 0 \pm 1^\circ</math>          (C) Set the dots of the R-Y on the V axis of the vector.  <math>C = 0 \pm 1^\circ</math></p>

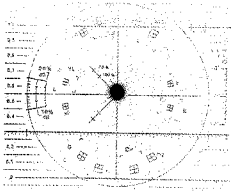
CONNECTION 3



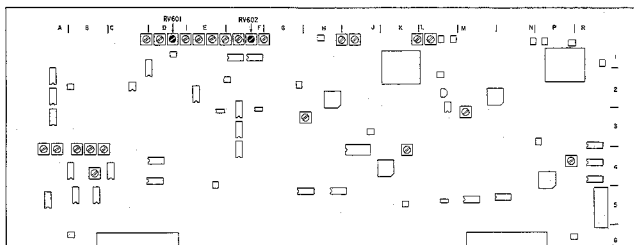
## 7. PB Composite SC Leak Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode Flat field / CR5-1B PS (24:00 - 26:00)</li> <li>Use the Waveform Vector (1751) on WFM mode.</li> <li>Set the time axis of the WFM to magnification mode.</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) U SC LEAK                      (B) V SC LEAK            RV602 / VP-43 (F-1)              RV601 / VP-43 (D-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM mode</p> <p>Before adjustment</p>  <p>↓</p> <p>After adjustment</p>  <p>Spec. Minimize the A. (<math>A \leq 0.01</math> V)              Minimize the B. (<math>A \leq 0.01</math> V)              Adjust alternately.</p>

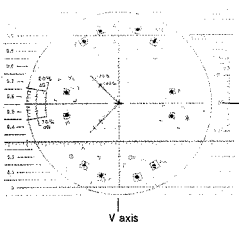
CONNECTION 3

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• PB mode Flat field / CR5-1B PS (24:00 - 26:00)</li> <li>• Use the Waveform Vector (1751) on VECTOR mode.</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>TRIG : REF. VIDEO</p> <p>Vector mode</p>  <p>CONNECTION 3</p> <p>Spec. Maximum the gain of the Vector and check the dot is at center.</p>

VP-43 board (A side)

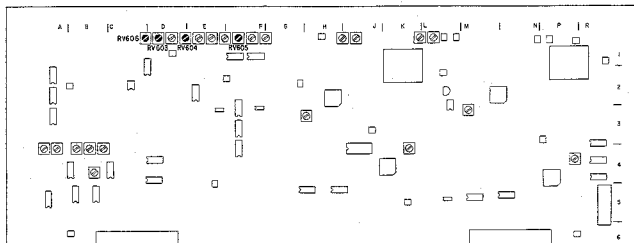


## 8. PB Composite C Level Adjustment

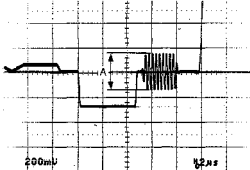
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14:00 – 17:00)</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) Burst            ⦿ PHASE control / Vector</p> <p>(B) V axis (ENC R-Y)            ⦿ RV604 / VP-43 (D-1)</p> <p>(C) U axis (ENC B-Y)            ⦿ RV605 / VP-43 (F-1)</p> <p>TRIG : REF. VIDEO</p> <p>Vector</p>  <p>Spec. (A) Set the dot of the burst on the right position on the scale. All dots should be inside the "□" mark on the vector by adjustment RV604 and RV605 alternately.</p>

CONNECTION 3

### VP-43 board (A side)




## 9. PB Composite Burst Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14:00 – 17:00)</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>RV603 / VP-43 (D-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.300 \pm 0.007</math> V</p>

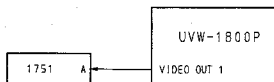
CONNECTION 3

## 10. PB S-VIDEO C Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> <li>100 % color bar / CR5-1B PS (14:00 – 17:00)</li> </ul>	<p>S-VIDEO (C) OUT 1 (75 <math>\Omega</math> terminated)</p> <p>RV606 / VP-43 (C-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. <math>A = 0.885 \pm 0.01</math> Vp-p</p>

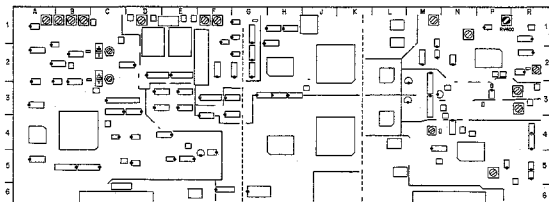
CONNECTION 3

**11. PB Composite Y/C Delay Adjustment <TBC-25 Board>**  
**[CONNECTION]**



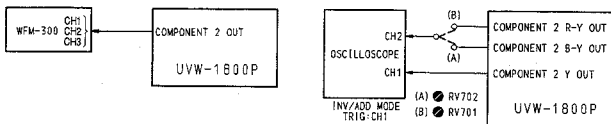
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode</li> </ul> <p>LINE 17A / CRS-1B PS (19:00 - 22:00)</p>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>RV400 / TBC-25 (P-1)</p> <p>TRIG: INT / WFM</p> <p>WFM</p> <p>Before adjustment</p> <p>10T portion</p> <p>Minimize</p> <p>After adjustment</p> <p>Spec. Flat</p>

TBC-25 board (A side)



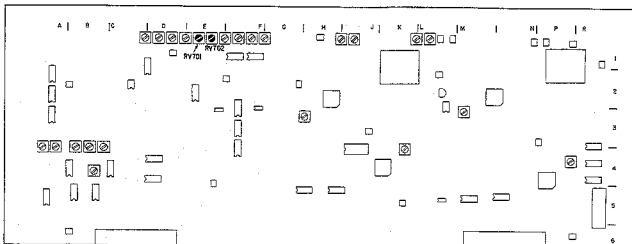
## 12. PB Component Y / C Delay Adjustment

[Connection]



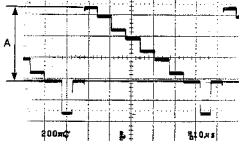
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>PB mode 50 % BOWTIE &amp; 10T/ CR5-1B PS (17:00 - 19:00)</li> <li>WFM300; BOWTIE mode. (WFM)</li> </ul>	<p>COMPONENT 2 OUT (75 <math>\Omega</math> terminated)</p> <p>(A) B-Y DELAY ● RV702 / VP-43 (E-1)</p> <p>(B) R-Y DELAY ● RV701 / VP-43 (E-1)</p> <p>TRIG: EXT / WFM</p> <p>WFM</p> <p>Spec. Set the each BOWTIE DIP point of (A) and (B) on the center marker. <math>0 \pm 20</math> nsec</p>

VP-43 board (A side)

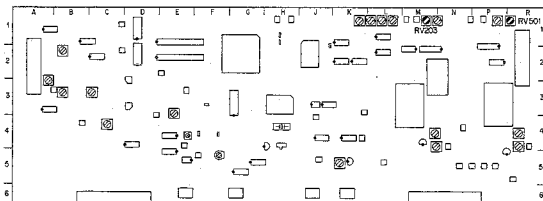


## VRA-5 BOARD

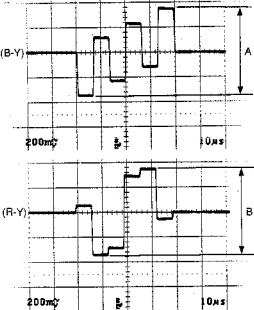
### 1. Overall Component Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>EE mode</li> <li>COMPONENT 2 INPUT ; 100 % color bar</li> <li>INPUT SELECT switch / Sub control panel : Y-R, B</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>RV501 / VRA-5 (R-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or oscilloscope</p>  <p>Spec. <math>A = 0.70 \pm 0.02</math> V</p>
<p>CONNECTION 2</p>	
<p>Step 2</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>COMPONENT 2 INPUT ; 100 % color bar</li> <li>INPUT SELECT switch / Sub control panel : Y-R, B</li> <li>Playback the recorded portion. Blank tape</li> </ul>	<p>Spec. Satisfied the spec. referring Step 1.</p>
<p>CONNECTION 2</p>	

VRA-5 board (A side)

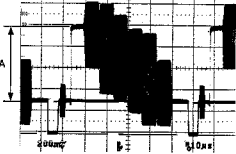


## 2. Overall Component R-Y / B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• COMPONENT 2 INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> </ul> <p>CONNECTION 2</p>	<p>COMPONENT 2 B-Y / R-Y OUT (75 <math>\Omega</math> terminated)</p> <p>(A) • (B) CNT-C LEVEL            Ⓞ RV203 / VRA-5 (M-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or oscilloscope</p>  <p>Spec. <math>A = B = 0.70 \pm 0.02</math> Vp-p</p>
<p>Step 2</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• COMPONENT 2 INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; Y-R, B</li> <li>• Playback the recorded portion. Blank tape</li> </ul> <p>CONNECTION 2</p>	<p>Spec. Satisfied the spec. referring Step 1, B-Y and R-Y.</p>



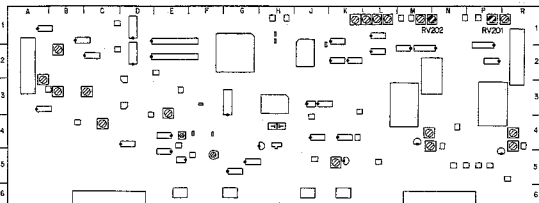
### 3. Overall Composite Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• VIDEO INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> </ul> <p>CONNECTION 3</p>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>RV201 / VRA-5 (P-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or oscilloscope</p>  <p>Spec. <math>A = 0.70 \pm 0.02</math> V</p>
<p>Step 2</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• VIDEO INPUT ; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> <li>• Playback the recorded portion. Blank tape</li> </ul> <p>CONNECTION 3</p>	<p>Spec. Satisfied the spec. referring Step 1.</p>

#### 4. Overall Composite C Level Adjustment

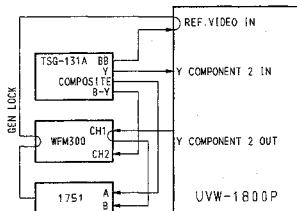
Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode VIDEO INPUT; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> </ul> <p>CONNECTION 3</p>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>(A) Burst ⊙ PHASE control / Vector</p> <p>(B) C ST-C LEVEL ⊙ RV202 / VRA-5 (N-1)</p> <p>TRIG : REF. VIDEO</p> <p>Vector</p> <p>Spec. (A) Set the dot of the burst on the right position on the scale.</p> <p>(B) All dots should be inside the "田" mark on the vector.</p>
<p>Step 2</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• VIDEO INPUT; 100 % color bar</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> <li>• Playback the recorded portion. Blank tape</li> </ul> <p>CONNECTION 3</p>	<p>Spec. Satisfied the spec. referring Step 1.</p>

VRA-5 board (A side)

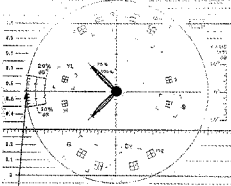


## 5. Overall Video Phase Adjustment

[CONNECTION for Step 1 to 4]

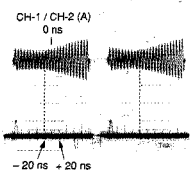
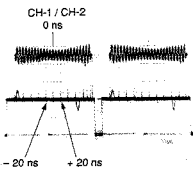


Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>EE mode</li> <li>COMPONENT 2 INPUT ; 50 % BOWTIE</li> <li>Set the following setting Waveform Vector (1751).</li> </ul> <p>WFM mode</p> <p>SWEEP : 1 <math>\mu</math>s (ZH/MAG)</p> <p>FILTER : FLAT</p> <p>EXT REF : EXT</p> <p>GAIN : <math>\times 1</math></p>	<p>CH-A                      CH-B</p> <p><input checked="" type="radio"/> HORIZ POS control / Vector                      <input checked="" type="radio"/> SYNC control / Sub control panel</p> <p>TRIG : EXT / WFM</p> <p>WFM mode</p> <p>Spec. Set the SYNC falling point to the center.</p>

Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• COMPONENT 2 INPUT ; 50 % BOWTIE</li> <li>• Use the Waveform Vector (1751) on SC-H mode.</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>⊗ SYNC control / Sub control panel</p> <p>TRIG : EXT / WFM</p> <p>SC-H mode</p>  <p>CH-A → CH-B</p> <p>Spec. 1. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above.</p> <p>2. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with the SYNC control on the sub control panel.</p> <p>(Note : The dot position should be adjust in the direction of the shortest movement.)</p>

Continues to the next page.

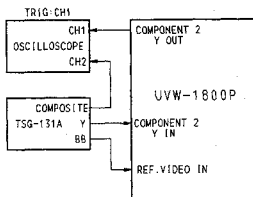
## 5. Overall Video Phase Adjustment (Continued)

Conditions for adjustment	Adjustment point • Specifications
<p>Step 3</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>EE mode</li> <li>COMPONENT 2 INPUT; 50 % BOWTIE</li> <li>INPUT SELECT switch / Sub control panel; Y-R, B</li> <li>WFM300; BOWTIE mode (WFM)</li> </ul>	<p>COMPONENT 2 Y OUT (75 <math>\Omega</math> terminated)</p> <p>● RV302 / VRA-5 (K-1)</p> <p>TRIG : EXT / WFM</p> <p>WFM</p> <p>Before adjustment</p>  <p>CH-1 / CH-2 (A) 0 ns</p> <p>- 20 ns + 20 ns</p> <p>↓</p> <p>After adjustment</p>  <p>CH-1 / CH-2 0 ns</p> <p>- 20 ns + 20 ns</p> <p>Spec. Set the BOWTIE DIP points (cross points of the CH-1 and CH-2) on the center marker.</p>
<p>Step 4</p> <ul style="list-style-type: none"> <li>Do not use the extension board.</li> <li>COMPONENT 2 INPUT; 50 % BOWTIE</li> <li>INPUT SELECT switch / Sub control panel; Y-R, B</li> <li>Play back the recorded portion. Blank tape</li> </ul>	<p>Spec. Difference on BOWTIE DIP point <math>\rightarrow 0 \pm 20</math> nsec</p> <p>When specification is not satisfied <math>\rightarrow</math> Adjust Step 3 again and check that perform Step 4</p>

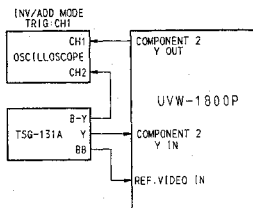
**[Reference]**

If not prepare the WFM300 / 1751, connect the oscilloscope following figure and adjust Step 1, 3 and 4.

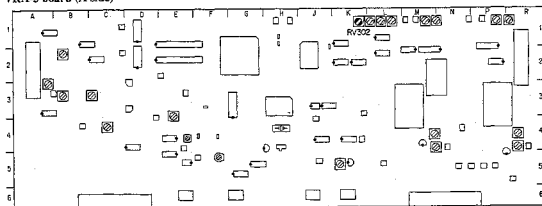
**[Connection for Step 1]**



**[Connection for Step 3 / 4]**

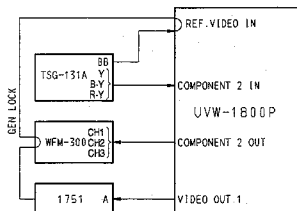


**YRA-5 board (A side)**



## 6. Overall Component Y / C Delay Adjustment

### [CONNECTION]

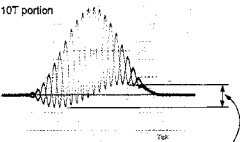
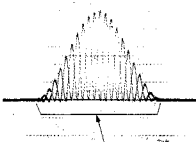


Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• EE mode</li> <li>• COMPONENT 2 INPUT; 50 % BOWTIE</li> <li>• INPUT SELECT switch / Sub control panel; Y-R, B</li> <li>• WFM300; BOWTIE mode (WFM)</li> </ul> <p>Note : Perform the CH-1 / CH-3 (B) adjust before the CH-1 / CH-2 (A) adjust.</p>	<p>COMPONENT 2 OUT (75 <math>\Omega</math> terminated)</p> <p>(A) C-C DELAY RV103 / VRA-5 (C-4)</p> <p>(B) CAV Y / C DELAY RV304 / VRA-5 (L-1)</p> <p>TRIG : EXT / WFM</p> <p>WFM</p> <p>Before adjustment</p> <p>CH-1 / CH-2 (A) 0 ns</p> <p>CH-1 / CH-3 (B) 0 ns</p> <p>-20 ns +20 ns -20 ns +20 ns</p> <p>↓</p> <p>After adjustment</p> <p>CH-1 / CH-2 0 ns</p> <p>CH-1 / CH-3 0 ns</p> <p>-20 ns +20 ns -20 ns +20 ns</p> <p>Spec. Set the each BOWTIE DIP point of (A) and (B) on the center marker. 0 <math>\pm</math> 10 nsec</p>

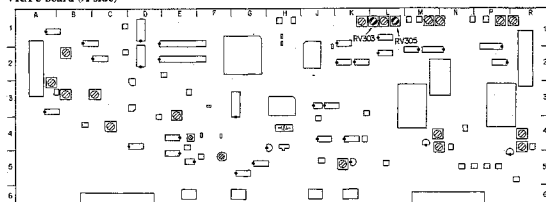




## 7. Overall Composite Y / C Delay Adjustment

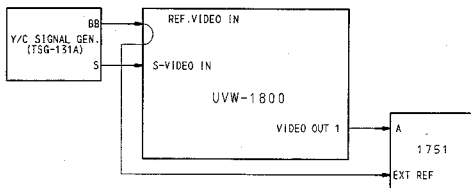
Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• VIDEO INPUT ; PULSE &amp; BAR</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>● RV303 / VRA-5 (L-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or oscilloscope</p> <p>Before adjustment</p> <p>10T portion</p>  <p>↓</p> <p>After adjustment</p>  <p>Spec. Flat</p> <p>(Compensate the difference of Step 2 after adjustment second time)</p>
<p>CONNECTION 3</p> <p>Step 2</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• VIDEO INPUT ; PULSE &amp; BAR</li> <li>• INPUT SELECT switch / Sub control panel ; COMPOSITE</li> <li>• Play back the recorded portion. Blank tape</li> </ul>	<p>Spec. Difference from center → <math>0 \pm 30</math> nsec</p> <p>When specification is not satisfied → Adjust Step 1 again and check that perform Step 2.</p>

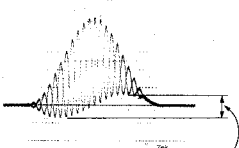
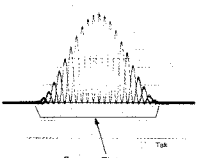
VRA-5 board (A side)



## 8. Overall S-VIDEO Y / C Delay Adjustment

### [CONNECTION]



Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> <li>• Do not use the extension board.</li> <li>• EE mode</li> <li>• S-VIDEO INPUT ; PULSE &amp; BAR</li> <li>• INPUT SELECT switch / Sub control panel ; S-VIDEO</li> </ul>	<p>VIDEO OUT 1 (75 <math>\Omega</math> terminated)</p> <p>● RV305 / VRA-5 (L-1)</p> <p>TRIG : EXT / WFM</p> <p>WFM or oscilloscope</p> <p>Before adjustment</p>  <p>↓</p> <p>After adjustment</p> 

Continues to the next page.

## 8. Overall S-VIDEO Y / C Delay Adjustment (Continued)

Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"><li>• Do not use the extension board.</li><li>• S-VIDEO INPUT ; PULSE &amp; BAR</li><li>• INPUT SELECT switch / Sub control panel ; S-VIDEO</li><li>• Play back the recorded portion. Blank tape</li></ul>	<p>Spec. Difference from center → <math>0 \pm 20</math> nsec</p> <p>When specification is not satisfied → Adjust Step 1 again and check that perform Step 2.</p>